STRUCTURE OF B. Sc ECS PROGRAMME UNDER CBCS PATTERN
Faculty of Science

BSc (ECS)- II (CBCS Pattern)
To be implemented from A.Y. 2021-2022
Structure of Undergraduate Science BSc (ECS)- II Programme

Semester	Course			Teaching Scheme/week		
				Hours	Lectures	Credits
III	DSC-1C		Data structure using C	4.8	6	4
			Data Base Management System			
			Practical-II	4	5	2
	DSC-2C		Advanced Microprocessor	4.8	6	4
			Basics of Embedded System			
			Practical-II	4	5	2
	DSC-3C		Descriptive Statistics-I	4.8	6	4
			Discrete Probability Distributions			
			Practical-II	4	5	2
	SEC-1		Software Engineering and Software testing	2.4	3	2
			Total	**28.8**	**36**	**20**
IV	AECC-B (Environmental Studies)	Theory-I		3.2	4	NC
	DSC-1D		Core Java	4.8	6	4
			Advanced Web Technology			
			Practical-III	4	5	2
	DSC-2D		Peripheral Interface	4.8	6	4
			Advanced Embedded System			
			Practical-III	4	5	2
	DSC-3D		Descriptive Statistics- II	4.8	6	4
			Continuous Probability Distributions			
			Practical-III	4	5	2
	SEC-2		Linux OS and Shell Programming	2.4	3	2
			Total	**28.8+3.2**	**36+4**	**20**
	Total Semester III and IV			**57.6+3.2**	**72+4**	**40**

Structure of Examination Mark Scheme of BSc (ECS)- II (CBCS Pattern) Programme

Semester	Course		EXAMINATION Marks			Credits
			CA	SE	Total	
III	DSC-1C	Data structure using C	15	35	50	2
		Database Management System	15	35	50	2
	DSC-2C	Advanced Microprocessor	15	35	50	2
		Basics of Embedded System	15	35	50	2
	DSC-3C	Descriptive Statistics-I	15	35	50	2
		Discrete Probability Distributions	15	35	50	2
	SEC-1	Software Engineering and Software testing	15	35	50	2
		Total	**105**	**245**	**350**	**14**
IV	AECC-B (Environmental Studies)	Theory-I	15	35	50	NC
	DSC-1D	Core Java	15	35	50	2
		Advanced Web Technology	15	35	50	2
	DSC-2D	Peripheral Interface	15	35	50	2
		Advanced Embedded System	15	35	50	2
	DSC-3D	Descriptive Statistics- II	15	35	50	2
		Continuous Probability Distributions	15	35	50	2
	SEC-2	Linux OS and Shell Programming	15	35	50	2
	DSC-1C	Practical-II	30	70	100	2
	DSC-2C	Practical-II	30	70	100	2
	DSC-3C	Practical-II	30	70	100	2
	DSC-1D	Practical-III	30	70	100	2
	DSC-2D	Practical-III	30	70	100	2
	DSC-3D	Practical-III	30	70	100	2
		Total	**300**	**700**	**1000**	**26**
Total Semester III and IV			**405**	**935**	**1350**	**40**

B.Sc (ECS)
(Bachelor of Entire Computer Science)

B.Sc (ECS) Bachelor of Entire Computer Science is a three years undergraduate program designed to train future professionals, rather than mere 'degree holders'. This course caters to the needs of e-commerce in industry where the students would ultimately find employment and therefore has a completely different approach to learning.

Program Outcomes

B.Sc (ECS) graduates will gain in-depth knowledge in the field of Computer, Science & Technology. The students will have the ability to design, implement and evaluate a computer-based system, process, component and program to meet desired IT needs.

Learning Objectives

1. To impart holistic knowledge about Computer Programming, Networking, Database Management and Web application Development Skills

2. To develop problem-solving skills to formalize general problem statements into precise algorithmic solutions.

3. To train students as Computer Programmer, System Analyst, Data Administrator, Demonstration Officer etc.

Learning Model

The learning methodology includes Lectures, Assignments, Industrial Visits, Certified Courses, EDP, Project work & Seminars, Practical on Computer Programming languages , Networking, Database management , Web Technology, Mathematics, Statistics & Electronics etc.

Career Opportunities

Higher Education: The obvious choice after B.Sc. (ECS) is opting for Post-Graduation -M.Sc. (CS)/ M.C.A./M.B.A. Students have a prior knowledge of different aspects of Computer Science and B.Sc. (ECS) graduates often find it easier to success M.Sc. (CS)/M.C.A./M.B.A. as compared to other graduates.

Jobs: National / Multinational Companies and Government sectors as Software and Web Developer, System Engineer, Software Tester, Junior Programmer, System Administrator etc.

DETAILED SYLLABUS
Of
COURSES OFFERED BY THE PROGRAMME

Course Title: Data Structure Using C (2161301)

Course Code: DSC-1C Theory-I   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The basic objective of the course is to gain knowledge about understanding basic data structures and different types of algorithms

Unit No	Content	Hrs.
1	**Introduction to Data Structures:** Introduction, Definition and types of Data structure. Abstract Data Type (ADT)- ADT for array, ADT for stack, ADT for queue. Algorithm: Definition, Complexity overview of various algorithm design techniques.	8
2	**Stack:** Introduction to Stack, Operations of stack, Implementation of stack using array (Static and dynamic Implementation), Applications of Stack . Queue Introduction to Queue, Operations of queue, Types of Queue- Linear Queue, Circular Queue, Dequeue (Double Ended Queue), Priority queue. Implementation of Linear and Circular Queue (Static and dynamic Implementation), Difference between stack and queue, Applications of queue	10
3	**Linked Lists:** Introduction to Linked Lists, Types of linked list, Operations of linked list, Implementation of singly linked list and doubly linked list with basic operations Trees: Introduction to Tree, Introduction to Binary Trees, Types of Binary tree, Operations of Binary search tree, Tree Traversal methods, Deletion of Nodes, Implementation of binary search tree, Height balanced tree/AVL tree.	10
4	**Sorting and Searching:** Introduction and definition of Sorting, Types of Sorting-Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort, Introduction and definition of Searching, Types of searching-Linear (Sequential) Search, Binary Search.	8

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	learn how to choose the right data structure to represent a data item in a real problem.
2	Understand basic data structures such as arrays, linked lists, stacks and queues.
3	understand the tree data structure with different tree traversal techniques.
4	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Suggested Readings:

1. Data structures using C and C++-Tanenbaum,Y. langsum- Prentice - Hall Of India Pvt. Ltd
2. Data Structures Through C in Depth-S.K.Srivastava, D.Srivastava-BPB Publications

Course Title: DATA BASE MANAGEMENT SYSTEM (2161302)

Course Code: DSC-1C Theory-II   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve efficiently and effectively information from a DBMS , essential concepts and design methodology for the Relational Database Model as implemented in MySQL.

Unit No	Content	Hrs.
1	**Introduction to database system:**-Definition, Limitations of traditional file system, Advantages of DBMS, Components of DBMS, Database Architecture, Database Users, Schemas and instances, 2 tier and 3 tier architecture, Database languages, Types of data models- relational, Network, Hierarchical, Distributed E-R model: Tuple, attributes and its types, Degree, Generalization, Specialization, Aggregation.	8
2	**Relational Model and Database design:**-Relation, Domain, Tuples, types of keys, relational integrity rules, Dr. Codd's rules, Relational Algebra operations:-Select, Project, Cartesian Product, Union, Set difference, Natural Join, Outer Join, lossless joins, Data dictionary. Basic Introduction of Transaction, concurrent execution.	8
3	**MySQL** History of MySQL, Installation of MYSQL, MySQL Architecture, Invoking MySQL through Command Line, MySQL Server Start and Stop, Overview of Data Types in MySQL, Defining a Database, Creating Tables and Fields in MySQL	10
4	**SQL & Procedural Language in MySQL**:-DDL, DML,DCL queries, Simple Queries, Expressions, Conditions and Operators, Aggregate Functions, Group by-having, Where clause, Joins, Sub queries, Views, indexes, sequences. Blocks, Conditional statements and loops, Cursors and types, procedures and triggers.	10

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Describe the features of database management systems, architecture of database systems, and the role of database users.
2	Analyze concept of Entity-Relationship model based on user requirements.
3	Design basics relational data model.
4	Program a data-intensive application using DBMS APIs
5	Designs MySQL queries to create database tables and make structural modifications.
6	Designs SQL queries to add data to the database, edit existing data, and to delete data from the database.

Suggested Readings:

1. Database System Concepts-Korth SilberschetzMcGraw Hill Education
2. Fundamentals of Database Systems-Elmsari, Navathe-Pearson Education India

3. MySQL(TM): The Complete Reference-Vikram Vaswani-McGraw Hill Education
4. MySQL Cookbook-Paul DuBois-O'Reilly Media, Inc.

Course Title: Advanced Microprocessor (2161303)

Course Code: DSC-2C Theory-I   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor 8086. Assembly language programming will be studied as well as the design of various types of digital and analog interfaces

Unit No	Content	Hrs.
1	**16 Bit Microprocessor: 8086** Salient features Pin descriptions of 8086, Architecture of 8086 - Functional Block diagram Register organization, Concepts of pipelining, Memory segmentation Physical memory addresses generation.	10
2	**Operating Modes of 8086** Minimum Mode operation of 8086 ,timing diagram of minimum mode, Maximum Mode of 8086 ,timing diagram of maximum mode	8
3	**Instruction Set of 8086 Microprocessor** Addressing modes ,Arithmetic Instructions , Logical Instructions , Data transfer instructions, Bit manipulation instructions, String Operation Instructions, Program control transfer or branching Instructions, Process control Instructions, Program development steps, Assembly Language Programming Tools	10
4	**8086 Assembly Language Programming.** Directives, Arithmetic operations on Hex and BCD numbers - Addition, Subtraction, Multiplication and Division Sum of Series Smallest and Largest numbers from array Sorting numbers in Ascending and Descending order Finding ODD/EVEN numbers in the array Finding Positive and Negative Numbers in array Block transfer, Count Numbers of '1' and '0' in 8/16 bit number	8

Co No	Expected Course Outcomes *On completion of this course, the students should be able to:*
1	.Describe the general architecture of a microcomputer system and architecture organization of 8086 Microprocessor
2	Realize the Interfacing of memory & various I/O devices with 8086 microprocessor
3	Describe the working of Minimum and maximum modes of 8086
4	Classify the instruction set of 8086 microprocessor
5	Distinguish the use of different instructions
	Use instructions in assembly language programming.

Suggested Readings:

1. Microprocessors and Interfacing Programming Hardware-By Douglas Hall-Tata McGraw Hill Education Private Limited, 2005

2. Microprocessors principles and Application-By Alit Pal-Tata McGraw - Hill Publishing Co.Ltd

Course Title: Basics of Embedded System (2161304)

Course Code: DSC-2C Theory-II   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The objective of this course is to enable the students to understand embedded-system and programming and apply that knowledge to design and develop embedded solutions.

Unit No	Content	Hrs.
1	**Introduction to Embedded System** Definition, Applications of Embedded System, Characteristics, Categories, Minimum requirement of Basic ES, Design Challenges, Design Metrics, Recent Trends in ES	8
2	**Microcontroller 8051** Architecture, Pin diagram, Registers, Internal Memory organization, External memory organization, IO Port functions, Timers ,serial communication and Interrupts	10
3	**Programming 8051 with Embedded C** Basic structure Embedded C program, Concept of super loop, An Embedded C program for: Generation of Time delay, Square wave generation, programming IO ports and Interrupts	10
4	**Interfacing of Devices** Development of both hardware and software for interfacing of switches, LEDs, Stepper Motor,7 segment display, LCD, ADC ,DAC	8

Co No	Expected Course Outcomes *On completion of this course, the students should be able to:*
1	Understand the concept of embedded system, microcontroller, different components of microcontroller and their interactions.
2	Understand the importance of Microcontroller in the functioning of embedded systems
3	Acquire the detailed knowledge of Microcontroller 8051 and Embedded C Programming language.
4	Interface Microcontroller with other I/O devices

Suggested Readings:

1. The 8051 microcontroller and embedded systems-By Muhammad Ali Mazidi, Janice Gillispie Mazidi.
   Pearson education /Prentice hall of India
2. The 8051 Microcontroller: Architecture, Programming and Applications- Kenneth Ayala-Penram International

Course Title: Descriptive Statistics-I (2161305)

Course Code: DSC-3C Theory-I   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives: The main objective of this course is to become acquainted with various methods of collecting data and get familiar with some elementary methods of data viz. Measures of central tendency, dispersion, skewness and kurtosis and to interpret them.

Unit No	Content	Hrs.
1	**Introduction to Statistics** Concept of population and sample, Methods of data collection- census and sampling methods Sampling methods- SRSWR, SRSWOR, (Description only) Measurement of variables- Nominal, Ordinal, ratio and interval Scale Objects of classification and Tabulation, Principles of classification and Tabulation, Construction of frequency distribution, Cumulative frequency distribution. Graphical representation of data: Histogram, Simple Bar chart, Pie chart, Frequency curve, Ogive curves.	8
2	**Measures of central tendency** Concept of central tendency, criterion for good measures of central tendency. Arithmetic Mean- definition, computation for ungrouped and grouped data, combined mean, effect of change in origin and scale(without proof), properties of arithmetic mean (without proof), merits and demerits. Median- definition, computation for ungrouped and grouped data, graphical determination of median using ogive curve, merits and demerits. Mode- definition, computation for ungrouped and grouped data, graphical determination of mode using histogram, merits and demerits. Empirical relationship between mean, median and Mode Geometric mean and Harmonic mean- definition, computation for ungrouped data. Quartiles- definition, computation for ungrouped and grouped data. Numerical problems	10
3	**Measures of Dispersion** Concept of dispersion, absolute and relatives measures of dispersion. Range- definition, computation for ungrouped and grouped data, Coefficient of range, merits and demerits. Variance and Standard Deviation (SD) –definition, computation for ungrouped and grouped data, Coefficient of variation, Combined SD, effect of change of origin and scale property(without proof), merits and demerits. Semi-inter quartile range, Quartile Deviation, Coefficient of Quartile	10

	deviation - Definition, computation for ungrouped and grouped data. Numerical problems.	
4	**Measures of Skewness and Kurtosis** Concept of skewness and kurtosis Pearson's β and γ coefficients based on moments (Statement only), Karl Pearson's coefficient of skewness (Sk), definition and computation. Prof. Bowley's coefficient of skewness based on quartiles.	8

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Students will able for collection & tabulation of data using scientific methods of data collection
2	Enable students to do descriptive analysis of data pertaining to objective of study
3	Students will learn the notion of measures of central tendency & dispersion, also the proper implementation of these statistical tools in real life situations
4	Students will learn the concept of linear relationship between two variables & methods of establishing the relationship
5	Students will able to do predictive analysis using regression model
6	Students will do statistical analysis using software's like R, SPSS etc.

Suggested Readings:

1. Fundamentals of Statistics Vol. I and II Goon A.M., Gupta M.K., and Dasgupta B.World Press, Calcutta
2. Statistical Methods S. P. Gupta Sultan Chand and Sons, New Delhi 2002
3. Business Statistics S. Shaha Hyperion Books
4. Fundamentals of Mathematical Statistics Kapoor and Gupta Sultan Chand and Sons, New Delhi
5. Comprehensive Statistical Methods P. N. Arora,Summeet Arora, S. Arora Sultan Chand and Sons, New Delhi
6. Introduction to discrete probability and probability distributions Madhav B. kulkarni, Surendra B. Ghatpande Nashik SIPF Academy publishers consultant

Course Title: Discrete Probability Distributions (2161306)

Course Code: DSC-3C Theory-II   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives: The main objective of this course is to become acquainted with the concept of random variable, probability, conditional probability and computation of probabilities of various events, characteristics of random variables such as expectation and variance

Unit No	Content	Hrs.
1	**Theory of Probability** 1.Preliminary notion of sets, Algebra of sets 2.Concept and definition of Sample space, Event, Exhaustive event, Mutually exclusive events, Exhaustive events, Independent events, Complementary events, Illustrative examples. 3.Classical definition of probability and it limitations 4.Axioms of probability , Results on probability (Statement only) 5.Conditional probability: concept and definition, multiplication law of probability (statement only) 6.Independence of events: concept and definition, pair wise and complete independence (for 3 events), Partition of sample space and Baye's theorem (statement only) 7.Numerical problems	10
2	**Random variables and Distribution functions** 1. Concept and definition of discrete random variable, Probability mass function, Probability distribution function, Properties of probability distribution function (Statement only). Illustrative examples. 2. Expectation and variance of discrete random variable- Definition and computation.	8
3	**Binomial Distribution:** Definition, mean, variance, recurrence relation for computation of probability (Statement only), Additive property of Binomial distribution (without proof), Illustration with real life situations. Application of Binomial distribution	8
4	**Poisson Distribution** Definition, mean, variance, recurrence relation for computation of probability (Statement only), Additive property of Poisson distribution (without proof), Illustration with real life situations. Hypergeometric distribution Definition, mean, variance, Additive property of Poisson distribution (without proof), Illustration with real life situations.	10

Co No	Expected Course Outcomes
	On completion of this course, the students will be able to:
1	Learn basic difference between discrete and continuous random variables with real life situations
2	Basic fundamental aspects of probability theory with its applications
3	Learn widely used special discrete and continuous distributions with its properties
4	Able to estimate parameters of distribution with real life data
5	Understand basic concepts of testing of hypotheses
	Use statistical small & large tests of hypothesis with real data sets

Suggested Readings:

1. Comprehensive Statistical Methods P. N. Arora, Summeet Arora, S. Arora Sultan Chand and Sons, New Delhi
2. Introduction to discrete probability and probability distributions Madhav B. Kulkarni, Surendra B. Ghatpande Nashik SIPF Academy publisher's consultant

Course Title: Software Engineering and Software Testing (2161307)

Course Code: SEC-1   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The basic objective of software Engineering is to gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Unit No	Content	Hrs.
1	Introduction system, characteristics, Elements of system, Types of system, System Analysis, Role of System Analyst. Software Engineering: Definition, Characteristics of software, Qualities of software. System Development life cycle- Waterfall model, V-shape model, Spiral model, Prototyping, incremental, RAD.	8
2	**Software requirements specifications:** Functional, Non-functional requirements, User requirement, System requirements. Fact finding techniques: Interviews, Questionnaire, Record reviews, Observation Analysis and Design Tools: Flow charting, Decision tables, Decision Trees, Structure charting Techniques (HIPO). System Design: Data flow Diagram (Physical, Logical), Entity relation diagram, structured chart, Data Dictionary. Types of Dependencies, Normalization (1NF, 2NF, 3NF, BCNF, 4NF, 5NF).	10
3	**Coding:** Verification, size measures, complexity analysis, coding standards, Effort Estimation, Cost Estimation. Construction of the system: traditional and incremental approaches, conversion methods Software Implementation: Overview of maintenance process, types of maintenance. Introduction To Software Testing: Importance or need of software testing, Differences between Manual and Automation Testing	8
4	**Introduction to White Box Testing:** Advantages and Disadvantages of White box testing. Introduction to Black Box Testing: Advantages and Disadvantages of black box testing Software Test Life cycle Defect Life Cycle: Bug/Defect Life Cycle, Difference between Bug, Defect, Failure, Error, Defect Tracking and Reporting Bugs : Types of Bugs, Identifying the Bugs, Reporting the Bugs	10

Co No	Expected Course Outcomes *On completion of this course, the students should be able to:*
1	Describe the concept of System,Characteristics of System,Role of System Analyst.
2	Distinguish the various software process models such as Waterfall model,spiral model,V model.
3	Analyze the requirements and Prepare Software Requirement Specification document of the project.
4	Acquire the knowledge of manual and automation testing.
5	how to catch defects and bugs in the software using various latest methods.

Suggested Readings:

1. Lessons learned in Software Testing-Cem Kaner, James Bach & Bret Pettichord-Wiley
2. Software Engineering-Roger S. Pressman-McGraw Hill Higher Education
3. The art of Software Testing-Glenford J. Myers-John Wiley & Sons
4. A Practitioner's Guide to Software Test Design-Lee Copeland-Artech House Publishers
5. Analysis and Design of Information Systems-James Senn-Prentice-Hall of India Pvt.Ltd

Course Title: Core Java (2161401)

Course Code: DSC-1D Theory-I Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The basic objective of this course is to develop desktop applications with the help of basic concepts like Object Oriented concepts, Exception handling, AWT and JDBC technology.

Unit No	Content	Hrs.
1	**Introduction to Java** Java Architecture and Features, jdk Environment & tools, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators:(Arithmetic, Logical and Bitwise) and Expressions Control statements: conditional statements and loops statements Creating & Using Array,String class and It's Methods, StringBuffer and its Methods	8
2	**Object-Oriented Programming Overview** Introduction to Object-Oriented Programming, Defining class and objects, constructors, static and non static data members and methods, this keyword, public ,private & protected Data Members, Package. Inheritance & Polymorphism Access/Scope specifiers protected, Super, extends, single, multiple inheritance, Method overriding, Abstract classes, 'final' keyword, Extending interfaces Collection Framework Introduction, Little package interfaces : List, Set, Map	8
3	**Exception Handling and Database Connectivity** Exception types, built-in exceptions, try catch & finally block,creating your own exceptions, Accessing and manipulating databases using JDBC: Introduction to JDBC,JDBC Architecture, Types of Drivers JDBC Statement and its Methods:Statement, PreparedStatement, CallableStatement, execute(),executeUpdate(), executeQuery(), ResultSet interface	10
4	**AWT controls and Event Handling** AWT Component: window, Frame, Panel, Label, Button, Checkbox, RadioButton Choice, List, Menu, TextField, TextArea. Layouts Managers: BorderLayout, FlowLayout, GridLayout Event Delegation Model, Event Classes, Event Listener Interfaces	10

Co No	Expected Course Outcomes
	On completion of this course, the students should be able to:

1	Use the syntax and semantics of java programming and basic concept of object oriented programming concepts.
2	Develop reusable programs using the concepts of Inheritance and polymorphism,interface,package
3	Acquire the knowledge of Collection framework.
4	Apply JDBC knowledge to provide a program level interface for communicating with databases.
5	Develop the Desktop application with the help of awt and Jdbc Concept.

Suggested Readings:

1. Programming with Java E Balaguruswamy TATA McGraw Hill
2. Java-2 the complete Reference Patrick Naughton and Herbertz Schidt. TATA McGraw Hill

Course Title: Advanced Web Technology (2161402)

Course Code: DSC-1D Theory-II Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives:

The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP. Students will learn how to perform hands-on practice with a MySQL database to create database-driven HTML forms and reports etc. Students also learn how to configure PHP and Apache Web Server. Comprehensive lab exercises provide facilitated hands-on practice crucial to develop competence web sites.

Unit No	Content	Hrs.
1	**Introduction to Web Development:** Introduction to web applications, Client Side Vs Server Side Scripting WebServers: Local Servers and Remote Servers, Internet Information Server(IIS),Personal Web Server(PWS) Static website vs Dynamic website development.Introduction to PHP Framework, Basic PHP syntax, Data types in PHP, Variables, Constants, operators and Expressions, printing data on PHP page, Control statements: if, switch case, for, while, do while. Arrays: Initialization of an array, Types of Array, Array Functions, String: Formatting String for Presentation and Storage, Joining and Splitting String, Comparing String, Matching and Replacing Substring, patterns, basic regular expressions, String Functions. Functions: Defining and Calling Functions, Passing by Value and passing by references, Inbuilt Functions.	10
2	**Object Oriented Programming in PHP:** Object oriented concepts ,Define a class and objects, Class attributes , Object properties ,Object methods ,constructors and destructors ,Class constants ,Static method ,Inheritance ,Abstract classes ,Exception Handling ,Final keyword ,Implementing Interface	8
3	**Working With Forms:** Forms controls properties, methods and events, Retrieving form data with $_POST, $_GET and $_REQUEST arrays,Super global variables, Importing user input, Accessing user input, Combine HTML and PHP code, Using hidden fields, Redirecting the user, File upload and scripts, Validation-Server side validation, Client side validation (Java script)Working with Database MySQL: Connecting MYSQL, Defining a Database, Creating Tables, Inserting, deleting and updating data to a table, Displaying returned data on Web pages, Finding the number of rows	10
4	**State Management** Cookies: Setting time in a cookie with PHP, Deleting a cookie, Working with the query string Session: Starting a session, Registering Session variables, working with session variables, destroying session, passing session Ids, encoding and decoding session variables	8

Co No	Expected Course Outcomes *On completion of this course, the students should be able to:*
1	Distinguish between client side scripting server side scripting.
2	Acquire the basic knowledge of web development.
3	Analyze the syntax and semantics of Object oriented concept in PHP
4	Analyze the construction of a web page and relate how PHP and HTML combine to produce the web page.
5	Develop Websites by using PHP with MYSQL concept and Apply the state management concept in development of Web Application.

Suggested Readings:
1. PHP: The Complete Reference Steven Holzner. TATA McGraw Hill
2. Learning php, mysql, javascript and css Robin Nixon O'Reilly Media, Inc.
3. Programming PHP Rasmus lerdorf, Kevin Tatroe. O'Reilly Media, Inc.

Course Title: Peripheral Interface (2161403)

Course Code: DSC-2D Theory-I Total Hours 30   Course Credits 2   Total Marks 50
Course Objectives: To introduce the programming and interfacing techniques of different peripheral Ic to 8086 microprocessor and to provide knowledge history ,family and architecture of ARM processor

Unit No	Content	Hrs.
1	**Study of Peripheral chips 8255,8251** 8255 (Programmable Peripheral Interface),Features, Block Diagram, Control & Operating modes, Serial Communication- Synchronous & Asynchronous, 8251(USART): Features, Block Diagram, Control & status registers, Operating modes, Interfacing & Programming (8255 and 8251)	8
2	**Study of Peripheral chips 8279,8253,8237** 8279 Keyboard and Display Controller, Features, Block Diagram, Control & status registers, Operating modes 8253 (Programmable Interval Timer): Features, Block Diagram, Control & status registers, Operating modes, Interfacing & Programming, Concept of DMA, 8237 DMA Controller: Features, Block Diagram.	10
3	**Interfacing with 8086 Microprocessor** Interfacing of peripheral devices LEDs ,Stepper Motor,7 segment display ,LCD ,ADC,DAC , Thumb Wheel Switch to 8086 through 8255	8
4	**ARM microprocessor** Need of advanced microprocessors, ARM Design Philosophy, History of ARM microprocessor, ARM processor family, Development of ARM architecture, The Acorn RISC Machine, ARM Core data flow model, Architectural inheritance The ARM7TDMI programmer's model: General purpose registers, CPSR, SPSR, ARM memory map, data format, load and store architecture, Core extensions, Architecture revisions, ARM development tools.	10

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Describe the general architecture of a microcomputer system and architecture organization of 8086 Microprocessor
2	Realize the Interfacing of memory & various I/O devices with 8086 microprocessor
3	Describe the working of Minimum and maximum modes of 8086
4	Classify the instruction set of 8086 microprocessor
5	Use instructions in assembly language programming
6	Describe ARM Core data flow model, Architectural inheritance and ARM7TDMI programming

Suggested Readings:
1. Microprocessors and Interfacing Programming Hardware-By Douglas Hall-Tata McGraw Hill Education Private Limited, 2005

2. "ARM System-on-Chip Architecture-Steve Furber-Addison-wesley

Course Title: Advanced Embedded System (2161404)

Course Code: DSC-2D Theory-II Total Hours 30   Course Credits 2   Total Marks 50
Course Objectives:

The main objective of the course is to provide knowledge about Arduino. To provide experience to integrate hardware and software for embedded applications using Arduino UNO development platform.

Unit No	Content	Hrs.
1	**Arduino** Introduction to Arduino, Pin configuration and architecture, Device and platform features, Concept of digital and analog ports	10
2	**Development Board & IDE :**Familiarizing with Arduino Interfacing Board, Different types of arduino board and Arduino IDE	8
3	**Programming basic of arduino** Introduction to Embedded C and Arduino platform, Program Structure, Arduino data types, Variables and constants, Operators, Control Statements, Arrays, Functions, Arduino i/o Functions	10
4	**Basic Interfacing and I/O Concept** Introduction to Interfacing, Interfacing LED, Switch, Relay and 7seg LED to arduino board	8

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Acquire the basic knowledge about Arduino development board
2	Understand the importance of Microcontroller in the functioning of embedded systems
3	Summarize different types of Arduino boards and their features and Arduino IDE
4	Understand the basic concept of Arduino programming to perform different tasks.
5	Interface Arduino board with other I/O devices

Suggested Readings:
1. Programming Arduino: Getting Started With Sketches (second edition)-Simon Monk-McGraw-Hill Education TAB
2. Programming with Arduino-Hans-Petter Halvorsen-Halvorsen Pub

Course Title: Descriptive Statistics- II (2161405)

Course Code: DSC-3D Theory-I   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives: The main objective of this course is to become acquainted with notion of bivariate data, correlation, regression, theory of attributes and use of R software for data analysis

Unit No	Content	Hrs.
1	**Correlation** Notion of bivariate data, Concept of correlation, types of correlation, real life examples of correlated variables. Scatter diagram- Definition, use, interpretation. Karl Pearson's coefficient of correlation (r)- definition, use, interpretation, computation of r for bivariate data. Coefficient of determination. Spearman's Rank correlation coefficient (R) - definition, use, interpretation, computation of R(without tie)	10
2	**Regression** Notion of regression, derivation of regression lines of Y o X and X on Y by least square method (statement only) Properties of regression coefficients (Statement only), Interpretation of regression coefficients. Numerical examples based on regression lines. Fitting of Curves- $Y=a+bX$, $Y=a X^b$, $Y=a+bx+cx^2$	8
3	**Theory of Attributes** Introduction, Notations, Order of classes and class frequencies. Determination of class frequencies (for dichotomous classification only), Consistency of data Independence of attributes, Association of attributes Yule's coefficient of association (Q), computation and interpretation. Application- Chi-Square test for independence of attributes. Numerical examples.	8
4	**Introduction to R software** Overview of R, R data types and objects, reading and writing data, functions and assignment, R as a calculator, matrix operations- Creating matrices , Matrix operations , Applying Functions to Matrix Rows and Columns , Data frames, import of external data in various - file formats, statistical functions, compilation of data. Statistical functions for central tendency, variation, skewness and kurtosis, Handling of Bivariate data through graphics using R: Scatter plot, Box Plot, Multiple bar chart, line chart- construction, use & Interpretation	10

Co No	Expected Course Outcomes
	On completion of this course, the students will be able to:
1	Understand the concept of bivariate data
2	Learn statistical tools used for bivariate data analysis

3	Able to fit linear regression model for real life datasets and interpretation
4	Understand the significance of statistical softwares in data analysis and use of R software for statistical analysis

Suggested Readings:

1. Fundamentals of Mathematical Statistics   S.C Gupta & V. K. Kapoor S. Chand, New Delhi
2. Basic Statistics Agarwal B. L New Age International (P) Ltd, 2015
3. Fundamentals of Statistics Vol. I and II Goon A.M., Gupta M.K., and Dasgupta B.World Press, Calcutta
4. Statistical Methods Gupta S. P. Sultan Chand and Sons, New Delhi 2002
5. Mathematical Statistics Saxena S, Kapoor J. N.Sultan Chand and Sons, New Delhi, 2005

Course Title: Continuous Probability Distributions (2161406)

Course Code: DSC-3D Theory-II   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives: The main objective of this course is to become acquainted with the concept of continuous random variables, continuous probability distributions and their properties, and the notion of testing hypotheses.

Unit No	Content	Hrs.
1	**Continuous random variable** Concept of continuous random variable, Definition- probability density function(pdf), Cumulative distribution function (cdf), properties of cdf (Statement only) Expectation of continuous random variables. Change of origin and scale property(Statement only). Illustrative examples. Variance of continuous random variable. Change of origin and scale property(Statement only). Illustrative examples.	8
2	**Uniform distribution and Exponential distribution** Notation $X \sim U(a, b)$, Definition, derivation of mean and variance. Cumulative distribution function and nature of probability density curve. Numerical examples. Exponential distribution Notation $X \sim Exp(\theta)$, definition, derivation of mean and variance, Cumulative distribution function and nature of probability density curve, lack of memory property(Statement only),	8
3	**Normal distribution** Definition, mean and variance (Statement only), probability density curve, Standard Normal Variate, properties of normal distribution, Additive property of normal distribution (Statement only), distribution of (aX+b), (aX+bY+c) when X and Y are independent, computations of probabilities using normal tables Chi-Square distribution as sum of squares of independent standard normal random variables, it's mean and variance (Statement only). Chi -Square problems.	10
4	**Application of normal distribution in testing of hypothesis** Definition – random sample, parameter, statistic, sampling distribution of statistic, standard error of statistic, Concept of null and alternative hypothesis, level of significance, types of error, critical region, concept of tests of hypothesis, one sided and two sided tests. Large sample test for testing single population mean Large sample test for testing two population mean	10

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Understand the notion of continuous random variable with illustrative examples
2	Learn the basic difference between probability distribution function & cumulative distribution function with their properties
3	To study continuous probability distributions with properties and fitting of continuous distributions to real datasets

4	Understand basic concepts of testing of hypotheses and use of small and large sample tests of hypotheses with real data sets

Suggested Readings:

1. Fundamentals of Mathematical Statistics   S.C Gupta & V. K. Kapoor S. Chand, New Delhi
2. Basic Statistics Agarwal B. L New Age International (P) Ltd, 2015
3. Fundamentals of Statistics Vol. I and II Goon A.M., Gupta M.K., and Dasgupta B. World Press, Calcutta
4. Statistical Methods Gupta S. P. Sultan Chand and Sons, New Delhi 2002
5. Mathematical Statistics Saxena S, Kapoor J. N. Sultan Chand and Sons, New Delhi, 2005

Course Title: Linux OS and Shell Programming (2161407)

Course Code: SEC-2   Total Hours 30   Course Credits 2   Total Marks 50

Course Objectives: The main objective of this course is to Write technical communication and effective use of concepts and terminology and facility with UNIX command syntax and semantics. and ability to read and understand specifications, scripts and programs.

Unit No	Content	Hrs.
1	**Introduction of Linux** : History of Linux, Architecture of Linux system & features, Shell & its type, Difference between Windows and Linux. Linux Distributions, Working environments: KDE, GNOME, Xface4. Installing and Configuring Linux OS. Linux File System: Hierarchy of File system, File System parts-Boot Block, Super Block, Inode Block, Data Block, File types, Mounting devices (CD/DVD, USB, hard drive partition).	8
2	**Users & Groups Management:** Create and manage Users or groups, Assigning permissions to users and Groups, File and Directory permissions- chmod, chown, chgrp. Linux commands : File and directory Management Commands:-mkdir, rmdir, cd ,pwd, file, ls, cat, more, less. File and Directory Operations : find, cp, mv, rm, ln, Printing the files lpr, lpq, lprm Filter Commands & Editor:-Filters: head, tail, pr, cut, paste, sort, uniq, tr, grep, egrep, fgrep, sed. Communication commands:- mesg, talk, write, wall, mail.	10
3	**Text Editors :** vi, vim, Archive and File compression commands Shell Programming : Shell Variables, Metacharacters, Shell Scripts – Control and Loop structure, I/O and Redirection, Piping. Process Management: Shell process, System process, background and foreground process, Changing process priority with nice. Listing processes-jobs, ps, kill, premature termination of process.	10
4	**Disk Management Tools :** Fdisk, Parted Boot Loaders - GRUB, LILO, Custom Loaders Role of system administrator Networking : services and Configuration files, starting services, Network tools-ping, finger, traceroute, who, host, Protocols and Services- SMB, FTP, DHCP, LDAP, NFS and NIS.	8

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Students will understand Linux basics and installation
2	Students will be able to explain Linux File System.
3	Students will understand the basic set of commands and utilities in Linux systems.
4	Students will be able to write shell programming and investigate & manage processes.
5	Students will be able to apply Linux networking concept to setup a small network.

Suggested Readings:

1. UNIX for programmers and users Graham Glass & King Ables Pearson Education

2. Beginning Linux Programming Neil Mathew & Richard Stones Wiley Dreamtech India
3. Red Hat Linux Bible Cristopher Negus Wiley Dreamtech India
4. UNIX Shell Programming Yeswant Kanethkar BPB Publication
5. UNIX concepts and applications sumitabha das Mcgraw hill publication

SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – III & IV)(W.E.F. JUNE 2021)

List of Experiments

<table>
<tr><td colspan="2" align="center">DSC-1C Practical-II (2161408)</td></tr>
<tr><td align="center">Experiment</td><td align="center">Title</td></tr>
<tr><td align="center">1</td><td>Write a program that prints array elements in reverse order.</td></tr>
<tr><td align="center">2</td><td>Write a program that finds multiplication of matrices.</td></tr>
<tr><td align="center">3</td><td>Write a program to implement stack by using array and Linked List.</td></tr>
<tr><td align="center">4</td><td>Write a program which converts infix expressions into prefix expressions.</td></tr>
<tr><td align="center">5</td><td>Write a program which checks if the entered expression is valid or not.</td></tr>
<tr><td align="center">6</td><td>Write a program to implement a linear queue by using array and linked list .</td></tr>
<tr><td align="center">7</td><td>Write a program to implement a Circular queue using arrays.</td></tr>
<tr><td align="center">8</td><td>Write a program to implement singly linear linked list with its basic operations</td></tr>
<tr><td align="center">9</td><td>Write a program to implement binary search tree with tree traversal methods.</td></tr>
<tr><td align="center">10</td><td>a)Write a program to implement a simple exchange sort method.
b) Write a program to implement the bubble sort method.
c) Write a program to implement insertion sort method.
d) Write a program to implement a Merge sort method.</td></tr>
<tr><td align="center">11</td><td>Write a program to implement linear searching and Binary Search technique.</td></tr>
<tr><td align="center">12</td><td>Create table employee (eno, name, dept, basic salary, HRA, tax, deduction). Dept are D1, D2, D3 and D4. Use constraints.
a. Insert 15 records.
b. Display the total amount spent by the company on salary.
c. Display name of dept for which company spend maximum amount.
d. Display the average salary of employees in a company.
e. Display average salary of each dept.
f. Display total salary for each dept.
g. Display highest salary for each dept.
h. Display different between average of max salary for each dept and average of each dept.
i. Display no of dept in the company.
j. Display name of all employee whose basic pay is higher then average salary.</td></tr>
<tr><td align="center">13</td><td>Create the following tables with all the necessary constraints like PRIMARY KEY, NOT NULL , UNIQUE, FOREIGN KEY.</td></tr>
</table>

Customers

CNUM	CNAME	CITY	RATING	SNUM
2001	Harsh	Baroda	100	1001
2002	Gita	Pune	200	1003
2003	Lalit	Mumbai	200	1002
2004	Govind	Delhi	300	1002
2006	Chirag	Surat	100	1001
2008	Prajkta	Delhi	300	1007
2007	Sushma	Mumbai	100	1004

Salesmen

SNUM	SNAME	CITY	COMMISSION
1001	Prashnat	Mumbai	12
1002	Rajesh	Surat	13
1004	Anandi	Mumbai	11
1007	Priya	Delhi	15
1003	Suchita	Pune	10
1005	Nayan	Baroda	14

Orders

ONUM	AMOUNT	ODATE	CNUM	SNUM
3001	18	10/3/2019	2008	1007
3003	767	15/3/2019	2001	1001
3002	1900	10/3/2019	2007	1004
3005	5160	20/4/2019	2003	1002
3006	1098	20/4/2019	2008	1007
3007	1713	10/5/2019	2002	1003
3008	75	10/5/2019	2004	1002
3010	4723	15/6/2019	2006	1001
3011	1309	18/3/2019	2004	1002

14	Solve the following queries using above databases and where clause range searching and pattern matching. Produce the order no, amount and date of all orders. Give all the information about all the customers with salesman number 1001. Display the following information in the order of city, sname, snumand commission. List of rating followed by the name of each customer in Surat. List of snum of all salesmen with orders in order table without any duplicates.
15	Solve the following queries using above databases and join. Show the name of all customers with their salesman's name. List all customers and salesmen who shared a same city. List all orders with the names of their customer and salesman. List all orders by the customers not located in the same city as their salesman. List all customers serviced by salespeople with commission above 12%.
16	Solve the following queries using above databases and delete and update. Remove all orders from customer Chirag from the orders table. set the ratings of all the customers of Piyush to 400. Increase the rating of all customers in Rome by 100. Salesman Sejal has left the company. Assign her customers to Miti.
17	1. Create a view Rate count that gives the count of no. of customers a teach rating.

	2. Create a view that shows all the customers who have the highest ratings.
18	1. Create a cursor emp_cur,fetch record from emp table and check whether sal>10000 then update Grade = 'A' else if sal = > 5000 and sal<= 10000 then update Grade = 'B' 2. Write a procedure to find the table structure of a given number
19	Create trigger for avoiding inserting the records whose address 'solapur' and deleting the records whose address 'satara'.(use any table with address field).

DSC-2C Practical-II (2161409)	
Experiment	Title
1	ALP for Addition Subtraction using 8086
2	ALP for Multiplication and Division using 8086
3	ALP for Sum of Series Numbers using 8086
4	ALP for Smallest numbers from array using 8086
5	ALP for Largest numbers from array using 8086
6	ALP for Sorting numbers in Ascending order using 8086
7	ALP for Sorting numbers in Descending order using 8086
8	ALP for Block transfer using 8086
9	ALP for Addition Subtraction using 8051
10	ALP for Multiplication and Division using 8051
11	ALP for Sum of Series Numbers using 8051
12	ALP for Smallest numbers from array using 8051
13	ALP for Largest numbers from array using 8051
14	Square wave generation with timer using embedded C
15	Interfacing LED with 8051 Microcontroller using Embedded C
16	Interfacing of stepper motor with 8051 Microcontroller using Embedded C
17	Interfacing of seven segment display with 8051 Microcontroller using Embedded C

DSC-3C Practical-II (21614010)	
Experiment	**Title**
1	Construction of discrete frequency distribution
2	Construction of Continuous frequency distribution
3	Diagrammatic & Graphical representation of the frequency distribution (Line diagram, Bar diagram, Pie diagram, Histogram, frequency curve)
4	Graphical determination of Median, Mode, & Location of Partition values.
5	Measures of central tendency (ungrouped data)- A.M, Median & Mode
6	Measures of central tendency (grouped data)- A.M, Median & Mode
7	Measures of central tendency (ungrouped data)- G.M & H.M
8	Calculation of combined mean & missing frequency
9	Measures of dispersion (ungrouped data)
10	Measures of dispersion (grouped data)
11	Combined variance & S.D
12	Moments, Skewness and Kurtosis (ungrouped data).
13	Moments, Skewness and Kurtosis (grouped data).
14	Fitting of Binomial distribution
15	Fitting of Poisson distribution
16	Application of Binomial, Poisson & Hypergeometric distribution

DSC-1D Practical-III (2161408)	
Experiment	**Title**
1	Write a program to check given year is leap year or not
2	Write a program to check given number Armstrong, palindrome or strong or not
3	Write a program for matrix operations like a) Addition b) Subtraction c) Multiplication.
4	Write a program for use of command line arguments.
5	Write a program which differentiates between mutable object and immutable objects.
6	Write a program to find area of rectangle by using class and object
7	Write a program using static & non-static data members.
8	Write a Program to demonstrate constructor overloading

9	Write a program that will demonstrate package
10	Write a program to implement Simple inheritance, Multiple inheritance, Multilevel inheritance, Hybrid inheritance and Hierarchical inheritance
11	Write a Program to create a student registration form by using AWT controls.
12	Write a Program to insert, update, delete, select data from database by using Statement interface and Prepared Statement.
13	Write PHP code to check entered number is Armstrong or Not.
14	Write a program to display student information by using class and objects
15	Write a program to implement interface.
16	Write a program to implement different types of inheritance.
17	Write a Program to implement File Upload to the server.
18	Write a Program to check given email id correct or not by using Regular expression
19	Design a web application to perform following task on employee table. I) Add II) Search III) Delete IV) Update
20	Design a web application that uses cookies and session object.

DSC-2D Practical-III (2161409)	
Experiment	**Title**
1	Interfacing LEDs to 8086
2	Interfacing Switches to 8086
3	Interfacing Stepper Motor to 8086
4	Interfacing 7 segment display
5	Interfacing LCD to 8086
6	Interfacing ADC,DAC to 8086
7	Interfacing Thumb Wheel to 8086
8	ALP for Interfacing 8253 with 8086
9	Identify each block on Arduino board
10	Develop program to display Hello World on serial monitor
11	Interface LED with Arduino board
12	ALP Blinking LED on Arduino board
13	Interface switch with Arduino board
14	Interfacing Potentiometer with Arduino and measure analog voltage
15	Interface Temperature sensor with Arduino board
16	Interface Light sensor with Arduino board

DSC-3D Practical-III (21614010)	
Experiment	**Title**
1	Computation of Karl Pearson's correlation coefficient
2	Computation of Spearman's Rank correlation coefficient(Without ties)
3	Fitting of lines of regression
4	Fitting of second degree & exponential curves
5	Attributes (consistency, Association & Independence).
6	Yule's coefficient of association
7	Fitting of Uniform distribution
8	Fitting of Normal distribution
9	Fitting of Exponential distribution
10	Application of Uniform and Exponential distribution
11	Application of Normal distribution
12	Large sample test for single mean
13	Large sample test for two population means.
14	Small sample test for single proportion
15	Small sample test for two population proportions
16	Handling of Bivariate data through graphics using R-(Scatter plot, Box Plot, Multiple bar chart & line chart)

SEC-2 Practical-II	
Experiment	**Title**
1	Write a shell script to find out the greatest among three inputs.
2	Write a shell script to find out the "n to the power y"(Square), where n and y must be input by the user.
3	Write a shell script to check whether an input is a prime or not.
4	Write a shell script to find out the sum of series
5	Write a shell script to generate the series 1, 5, 2, 10, 3, 15,.............50.
6	A departmental store announces its festival scheme to customers on cash payment. The scheme is as Follows- i) If the purchase amount is less than 1000 then Tax=2% and discount=10%.

	ii) If the purchase amount is greater than 1000 then Tax=5 % and discount=20%.
7	Write a shell script to read an integer and print its digits in reverse order.
8	The XYZ construction company plans to give a 5% year-end bonus to each of its employees earning Rs. 5,000 or more per year and a fixed bonus of Rs 250 to all other employees. Print the bonus of any employee
9	Write a shell script to print Fibonacci series.
10	Write a shell script for Swapping of Two Numbers.
11	Write a menu driven shell Script i) Change the group & owner of a directory ii) Set permission read, write & remove execute of a file iii) To check if a file is sorted.
12	Write a menu driven shell Script i) Change directory ii) Display first 15 lines only iii) To remove repeated data from a file.
13	Write a menu driven shell Script i) To find out Factorial. ii) To find out if a given no is perfect or not. iii) To find out whether Armstrong or not.
14	Write a Shell Script to check if a file is readable, writable and executable
15	Write a shell script to concatenate files.
16	Write a menu driven Script to make File and Directory Management Operations: i) Display Current directory ii) Make Directory iii) Edit a file iv) Copy a file v) Remove a file vi) Move a file.

Chairman
BOS in BSc.ECS

1) **Title of the Paper:** Environmental Studies
2) **Total Hours**: 60 hours

Structure for
Environmental Studies

	Name and type of the paper		L/P	Credits	Total Marks	SEE	CA*
	Type	**Name**					
Class& code	For All UG Semester IV (Second year)						
All UG II Year (4th Semester) (EVS)	**Ability Enhancement Course (AECC)**	**Environmental Studies**	**60**	**04**	**50**	**35**	**15**

Compulsory: *Unit Test / Assignment/ Seminar/ Nature Visits / Field Work / Field Tour/ Industrial visits of 1-2 days and submission of report is compulsory under internals marks (CA)

1. This course is not considered as a passing head for counting passing heads for ATKT
2. Student must pass this subject for award of the degree

Evaluation Scheme:

Theory paper has 50 marks out of which 35 marks will be for Term End examination (SEE) and 15 marks for College Internal Assessment (CA). The candidate has to appear for internal evaluation of 15 marks and external evaluation (College Examination) of 35 marks.

A) College Internal Evaluation:

In case of theory paper, internal examination has to conduct by College Marks for internal assessment shall be given based on Unit Test / Assignment/ Seminar/ Nature Visits / Field Work
/ Field Tour/ Industrial visits of 1-2 days and submission of report is compulsory under internals marks (CA)

B) External Evaluation (End of Term College Examination):

Nature of Theory question paper:
1) Theory paper is of 35 marks.
2) Theory paper will be of 2 hours duration
3) Students have to attempt all the questions.

Structure of the Course

CBCS BA PART II SEMESTER - IV AECC – EVS

Paper: Environmental Studies (2100433)

(Theory 35 + Internal 15 = 50

Marks)

COURSE CREDIT:- 3L + 1T/H=4   **COURSE CONTACT HOUR :- 50 L+ 10T/H=60**

Sr. No.	Module	Module contact hours
1	**Introduction to environmental studies**	04
2	**Ecosystems**	06
3	**Natural Resources: Renewable and Non-renewable Resources**	08
4	**Biodiversity and Conservation**	08
5	**Environmental Pollution**	08
6	**Environmental Policies & Practices**	08
7	**Human Communities and the Environment**	08
8	**Field work**	10
	Total	**60**

Environmental Studies (AECC) (2100433)

Learning Objectives:

To acquaint students with the concept of environmental studies

To compare the relation between human and environment

To analyze the resources and biodiversities

To aware with environmental issues and policies

Outcomes:

Explain the basic concepts in Environmental Studies

Categorize Ecosystems in different regions

Examine Natural Resources and Associated Problems

Motivate people for the conservation of environment

Justify the need of sustainable development,

Field study to a local area to document environmental assets

Module 1: Introduction to environmental studies   04

1.1 Multidisciplinary nature of environmental studies

1.2 Scope and importance of environmental studies

1.3 Concept of sustainability and sustainable development

Module 2: Ecosystems

06

2.1 Concept, Structure and function of ecosystem

2.2 Energy flow in an ecosystem: food chains, food webs and ecological succession.

2.3   Case studies of the following ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Module 3: Natural Resources: Renewable and Non-renewable Resources

08

3.1 Land resources and land use change; Land degradation, soil erosion and desertification.

3.2   Deforestation: Causes and impacts due to mining, dam building on environment, forests,

biodiversity and Tribal populations.

3.3 Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water International & inter-state.

3.4 Energy resources: Renewable and non- renewable energy sources, use of alternate energy sources, growing Energy needs, case studies

Module 4: Biodiversity and Conservation

08

4.1 Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots

4.2 India as a mega-biodiversity nation; Endangered and endemic species of India

4.3 Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions;

4.4 Conservation of biodiversity: In-situ and Ex--situ conservation of biodiversity.

4.5   Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Module 5: Environmental Pollution   08

5.1   Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution Nuclear hazards and human health risks

5.2 Solid waste management: Control measures of urban and industrial waste.

5.3 Pollution case studies.

Module 6: Environmental Policies & Practices 08

6.1   Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture

6.2   Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).

6.3 Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Module 7: Human Communities and the Environment 08

7.1 Human population growth: Impacts on environment, human health and welfare.

7.2 Resettlement and rehabilitation of project affected persons; case studies.

7.3 Disaster management: floods, earthquake, cyclones and landslides.

7.4 Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.

7.5 Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.

7.6 Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Module 8: Field work

10

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.

Suggested Readings:

1. Carson, R.2002.SilentSpring.HoughtonMifflinHarcourt.
2. Gadgil,M.,&Guha,R.1993.*ThisFissuredLand:AnEcologicalHistoryofIndia*. Univ. of CaliforniaPress.
3. Gleeson,B.andLow,N.(eds.)1999.*GlobalEthicsand Environment*,London, Routledge.
4. Gleick,P.H.1993. *Waterin Crisis*. Pacific Institute for Studies in Dev., Environment&Security.StockholmEnv.Institute, and OxfordUniv.Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of ConservationBiology*.Sunderland:Sinauer Associates, 2006.
6. Grumbine, R.Edward,and Pandit,M.K.2013.ThreatsfromIndia'sHimalaya dams. *Science,*339:36-‑37.
7. McCully,P.1996.*Riversnomore: the environmental effects of dams*(pp.29-‑64).Zed Books.
8. McNeill, JohnR. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum,E.P.,Odum,H.T.&Andrews,J.1971.*FundamentalsofEcology*.Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. AcademicPress.
11. Rao,M.N.&Datta,A.K.1987.*WasteWaterTreatment*.OxfordandIBHPublishing Co. Pvt.Ltd.
12. Raven,P.H.,Hassenzahl,D.M.&Berg,L.R.2012.*Environment*.8thedition.John Wiley &Sons.
13. Rosencranz,A.,Divan,S.,&Noble,M.L.2001.*Environmentallawandpolicyin India. Tripathi 1992.*
14. Sengupta, R.2003.Ecologyandeconomics: An approach to sustainable development. OUP.
15. Singh,J.S.,Singh,S.P.andGupta,S.R.2014.*Ecology,EnvironmentalScienceand Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi,N.S.,Gibson,L.&Raven,P.H.(eds).2013.*ConservationBiology*:*Vo ices fromtheTropics*.JohnWiley&Sons.
17. Thapar, V.1998.LandoftheTiger: ANaturalHistoryoftheIndianSubcontinent.
18. Warren, C.E.1971.BiologyandWaterPollutionControl.WBSaunders.
19. Wilson, E.O.2006.TheCreation:Anappealtosavelifeonearth.NewYork: Norton.
20. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford UniversityPress.
21. पर्यावरण अभ्यस, डॉ एन बी तेली, डॉ. एन. एन. चक्रदेव इत्यदी
22. पर्यावरण अभ्यस, डॉ बलभीम चव्हय

Chairman
BOS Environment Studies

SANGAMESHWAR COLLEGE, SOLAPUR
(AUTONOMOUS)

SANGAMESHWAR COLLEGE,
SOLAPUR
(AUTONOMOUS)