



"Education for Knowledge, Science, and Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe

**Shri Swami Vivekanand Shikshan Sanstha's  
Vivekanand College, Kolhapur  
(Autonomous)**

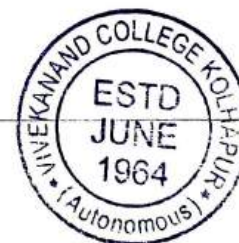


KOLHAPUR (AUTONOMOUS)

**B Sc Computer Science Entire (B.C.S.)**

**Content with Focus on Employability, Entrepreneurship, Skill Development**

Sr no.	Name of the Course	Course Code	Year of Introduction	Content with focus on employability	Content with focus on entrepreneurship	Content with focus on skill development
1	SEM - I English for Business Communication	AECC	2018-19	1.To understand the concept, process and importance of communication. 2.To gain knowledge of media of communication. 3.To develop skills of effective communication - both written and oral. 4.To make students familiar with information technology	1.Introduction information technology	1.Introduction to skills of effective communication - both written and oral.
2	Mathematics- Discrete Mathematics & Algebra Theory	GEC-1300A	2018-19	<b>Section 1:</b> <b>1. Counting Principle:</b> Counting : Addition & Multiplication principle, Permutation & Combination: Cardinality of finite set. Cardinality of union of sets (Addition principle) ,Principle of inclusion & exclusion, examples Combinatorial Arguments, Pigeonhole Principle (Statement Only),Examples. <b>4.Fuzzy Sets:</b> Introduction: Fuzzy numbers, Fuzzy set.Classical logic: Applying truth values-		<b>2.Recurrence relations</b> Linear Recurrence relation with constant coefficient, <b>3. Logic :</b> Propositions & Logical connectives : Definition, Types of Propositions, Truth values & Truth Tables, Tautology & Contradiction, Logical equivalence, Rules of inferences, Valid arguments & proofs, Methods of proofs: Direct & indirect, Duality



			<p>continuous variable, Linguistic variables  Types of Fuzzy Logics: Advantages of Fuzzy Logic :Disadvantages of Fuzzy Logic.  <b>Section II:</b>  1.Ordered pairs, Cartesian product  Relations. Types of relations, Equivalence relation, Partial ordering  Other types of relation: I reflexive, Asymmetric  Digraphs of relations, matrix presentation &amp; composition of relations  Transitive closure, Warshall's algorithm.  2. Congruence relation &amp; its properties  Fermat's theorem (Statement only),examples  Residue classes:definition,examples,addition modulo, multiplication modulo  3.POSET : definition, Hasse diagram,Lattice: definition, principle of duality,Basic properties of algebraic systems defined by Lattice,Distributive &amp; complemented lattice, Boolean Lattice &amp; Boolean algebra, Boolean expression &amp; Boolean functions, Disjunctive &amp; Conjunctive normal forms &amp; examples, Finite state machines.  4.Binary operation :definition, Semi group &amp; Monoids: definition &amp; examples, Group: definition &amp; examples, simple properties of groups, Sub-group: definition &amp; examples.</p>		of the statement, Predicates & Quantifiers,
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3	Electronics	GEC-1301A	2018-19	<p><b>Section I:</b> Definition of active and passive elements Resistors: Classification, color-code, specifications of resistors. Types of resistors:- Linear Resistors (Fixed):-Carbon composition, carbon film, wire wound. Linear resistors (Variable): -Wire wound, Potentiometer, Preset. Non-Linear resistors:- Thermostats, LDR and Varistors.</p> <p><b>Section II:</b> Different types of number system (Decimal, Binary, Octal, Hexa decimal Number system, Inter conversion From one System to another) and codes (BCD code, Gray code, Excess 3 code, ASCII code, EBCDIC code). Concept of parity, Signed</p>	<p><b>Section I:</b> Capacitors: Definition, Capacitance, capacitive reactance (XC), Charging and discharging of capacitor, Types of capacitors: -Fixed electrostatic capacitors:- ceramic, mica, paper, etc Fixed electrolytic capacitors:- Aluminum and Tantalum. (Construction of electrolyte Capacitor). Variable capacitors:- Air dielectric capacitor and Trimmers. Inductors and Transformers: Inductors:- Definition, symbol, Inductance, Inductive reactance (XL). Types of Inductors:- Air core, Iron core and ferrite core inductors.</p> <p><b>Section II:</b> Logic gates, Multiplexer, Demultiplexer, tree multiplexing, tree demultiplexing.</p>	<p><b>Section I:</b> working and I-V characteristics of PN junction diode. Diode applications, zener diode: Breakdown mechanism, Zener and Avalanche Break down I-V Characteristics Photo diode and LED, current limiting resistor for LED, Applications-Opto coupler, dot matrix display of LED, 7- segment display. Relation between <math>\alpha</math> and <math>\beta</math>, DC load line and Q point, potential divider Biasing, Concept of transistor as an amplifier and transistor as switch.</p> <p><b>Section II:</b> Concept of sequential circuits, Flip-flops: RS, Clocked RS, JK, Master Slave JK, D Flip-flop, Counter-Asynchronous, up/down. Decade, Synchronous, Ring Counter, Johnson counter</p>
4	Descriptive statistics-I and Discrete probability distributions	GEC-1302 A	2018-19	<p><b>Section I:</b> Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only). Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction frequency distribution. Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive curves and their uses. Examples and Problems.</p> <p>2.</p>	<p><b>Section II:</b> power set (sample space consisting at most 3 sample points). Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an event based on permutations and combinations.</p>	<p><b>Section II:</b> Definitions: discrete random variable, probability mass function (p.m.f.), cumulative distribution function (c.d.f.), properties of c.d.f., median, mode and examples.</p>



				<p>Median: computation for ungrouped and grouped data, Graphical method, merits and demerits, Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits. Quartiles: Definition, computation or ungrouped and grouped data graphical method.</p> <p>3.</p> <p>Measures of skewness: Types of skewness. Pearson's and Bowley's coefficients of skewness. Measures of skewness based on moments., Measures of kurtosis: Types of kurtosis. Measures of kurtosis based on moments.</p>	<p>axiomatic definition of probability with reference to finite and countably infinite sample space.</p>	
5	Computer Science	CC-CS-1303A	2018-19	<p>1. Basic elements of a communication system, Data Transmission modes, Data Transmission media, Types of networking Network Topologies, Definition and declaration, Operations on pointer, Pointer initialization, Pointer And Array, Pointer of pointer, Dynamic memory allocation. 2: Information Technology IT Assets and its managements, ITAct, Definition, declaration, prototype of function, Local and global variable, User defined functions, Storage classes, Recursion, Pointer and function, Call by value and Call by reference. 3: Database Management System, Data Models, Concept of RDBMS, RDBMS Terminologies, DBA &amp; Responsibilities of DBA, Relational Model, Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, self referential structure, Size of and type def, Definition of Union and declaration, Difference between structure and union. 4: Oracle Data types, Classification of SQL commands, Data Constraints, Concept of File, Text and binary files. Opening and closing files, File</p>	<p>1: Database Management System, Data Models, Concept of RDBMS, RDBMS Terminologies, DBA &amp; Responsibilities of DBA, Relational Model, Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, self referential structure, Size of and type def, Definition of Union and declaration, Difference between structure and union. 2: Oracle Data types, Classification of SQL commands, Data Constraints, Concept of File, Text and binary files. Opening and closing files, File opening mode.</p>	<p>1: Basic elements of a communication system, Data Transmission modes, Data Transmission media, Types of networking Network Topologies, Definition and declaration, Operations on pointer, Pointer initialization, Pointer And Array, Pointer of pointer, Dynamic memory allocation. 2: Information Technology IT Assets and its managements, ITAct, Definition, declaration, prototype of function, Local and global variable, User defined functions, Storage classes, Recursion, Pointer and function, Call by value and Call by reference. 3: Database Management System, Data Models, Concept of RDBMS, RDBMS Terminologies, DBA &amp; Responsibilities of DBA, Relational Model, Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, self referential structure, Size of and type def, Definition of Union and declaration, Difference between structure and union. 4: Oracle Data types, Classification of SQL</p>



				opening mode		commands, Data Constraints, Concept of File, Text and binary files, Opening and closing files, File opening mode
6	Sem II English for Business Communication	AECC	2018-19	1: Employment communication—Writing Resume, Acquiring Interview Skills etc. 2: Office management skills 3: effective communication - both written and oral	2: introduction to office management skills. 3: effective communication - both written and oral 4: with modern technology.	1: employment communication—Writing Resume, Acquiring Interview Skills etc 2: introduction to office management skills. 3: effective communication - both written and oral 4: with modern technology.
7	Mathematics	GEC-1300B	2018-19	1. Concept of statistical population with illustrations, concept of sample with illustrations. Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only). Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction frequency distribution. Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive curves and their uses. Measures of skewness: Types of skewness. Pearson's and Bowley's coefficients of skewness. Measures of skewness based on moments. Measures of kurtosis: Types of kurtosis. Measures of kurtosis based on moments. Numerical problems. <b>Section-II:</b> 1. Convergent, divergent, oscillatory sequences, definition & examples. Bounded sequence: definition & examples. Monotonic sequences, theorem on monotonic & bounded sequences (statement only)	2. Concept of central tendency. Criteria for good measures of central tendency. Arithmetic mean: Definition, computation for ungrouped and grouped data, Combined mean, weighted mean, merits and demerits. Median: computation for ungrouped and grouped data. Graphical method, merits and demerits. Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits. Quartiles: Definition, computation or ungrouped and grouped data graphical. <b>Section-II:</b> Comparison test & its limit form (for the series of positive term), Convergence of p-series (with proof). D'Alembert's ratio test (statement only) & examples.	3. Range and Quartile Deviation: definition for ungrouped and grouped data, and their coefficients, merits and demerits. Mean Deviation: Definition for ungrouped and grouped data, minimal Property (statement only). Standard deviation and Variance: definition for ungrouped and grouped data, coefficient of variation, combined variance and s. d. for two groups, merits and demerits. Numerical problems. <b>Section-II:</b> Rolle's theorem (with proof) & its geometric significance & example. Lagrange's mean value theorem (with proof) & its geometric significance & examples, Cauchy's mean value theorem (with proof) & examples. Leibnitz's theorem (with proof) & examples. L'Hospital's Rule (without proof) & examples. Taylor's & Maclaurin's theorems with Lagrange's & Cauchy's forms of remainders (without proof), Taylor's & Maclaurin's series



8	Electronics	GEC-1301B	2018-19	<p><b>I. Comparison between BJT and FET, classification of FETs, Structure and working of JFET, I-V characteristics and parameters (trans conductance, drain resistance, amplification factor) concept of MOSFET-depletion and Enhancement (construction and application only) Applications: FET as-Voltage Variable resistance, switch, memory cell, DRAM. Working of rectifier (Half, Full, Bridge);different parameters of rectifiers; filter circuits; concept of Regulator; concept of load and line regulation</b></p> <p><b>Section II:</b> Types of multivibrator block diagram of IC 555; Application of IC 555 as Astable, and Monostable (Calculation of frequency and Pulse width) Crystal clock using inverter. Clock circuit using NAND gate</p>	<p><b>2. General classification of amplifier, Idea of Multistage amplifier, different coupling methods (Direct coupling, RC coupling, Transformer coupling) Concept of positive and negative feedback. Barkhausen criteria: Types of oscillators RC coupled, Wein bridge, Hartley, Colpitts oscillator</b></p> <p>Zener diode As a regulator; concept of Three pin IC regulator(Block Diagram)positive and negative voltage regulator</p> <p><b>Section II:</b> Types of Memory-volatile and non-volatile, SRAM and DRAM, Classification and Working principle of memory devices; RAM, ROM, PROM, EPROM, and EEPROM; Concept of Diode Matrix ROM, speed and cost range of memory devices, Memory organization - building the required memory size by using available memory chips, memory address map</p>	<p><b>3. Concept of operational amplifier: ideal characteristics of Opamp; Different parameters of Op Amp, Virtual ground concept, Applications: inverting amplifier, non-inverting amplifier, Unity gain amplifier, buffer, Adder, subtractor, integrator and differentiator, comparator, Schmitt trigger ; ICs; SMPS block diagram; UPS: on line and offline (block diagram)</b></p> <p><b>Section II:</b> 1. Introduction, Types (8, 16, 32 Bits), Pin Diagram and Architecture of 8085, Pin Diagram and Architecture of 8086. 2. Instruction Set of 8085, ALP Programs for Addition, Subtraction, Multiplication, Division, Data transfer, Block Transfer.</p>
9	Descriptive statistics-II and Continuous	GEC-1302 B	2018-19	<p>Concept of bivariate data, scatter diagram, Concept of correlation, positive Correlation, negative correlation, cause and effect relation.</p>	<p>1. Concept of regression, Derivation of lines of regression by method of least squares 2. Regression coefficients and their significance, Properties of</p>	<p>1. Residual: definition, order, properties, mean and variance of residual. Fitting of multiple regression planes (without proof), Partial regression coefficients, interpretations, Concept of multiple</p>



	probability distributions and Testing of Hypothesis			<p>Karl Pearson's coefficient of correlation, properties of correlation Coefficient, interpretation of correlation coefficient.</p> <p><b>Section II :</b> Expectation of random variable, expectation of function of a random variable, mean, variance and examples. Uniform distribution: p.d.f. .c.d.f., mean, variance and eg.</p>	<p>regression coefficients. 3 Point of intersection and acute angle between regression lines</p> <p><b>Section II :</b> c.d.f., mean, variance, lack of memory</p>	<p>correlations. Definition of multiple Correlation Coefficients and its formula.</p> <p><b>Section II :</b> Exponential distribution :p.d.f. , Property and examples.</p>
10	Computer Science	CC- CS- 1303B	2018-19	<p>1.Basic elements of a communications system– sender, receiver and medium Data Transmission modes–Simplex, Half Duplex. Full Duplex Data Transmission Media–wire pairs, coaxialcable, Microwave System, , Optical fiber Definition of networking, Types of networking–LAN, MAN, WAN Network Topologies- BUS, Ring ,Star, Mesh and Hybrid</p> <p>Data types, Classification of SQL commands.3.Create Table Command 4.Insert t Command, Select Command using Where Clause. Delete Command and Update Command</p> <p>5.Data Constraints : Primary Key and Foreign key.</p> <p><b>Section II:</b> Definition and declaration. Operations on pointer. Pointer initialization. Pointer And Array, Pointer of pointer, Dynamic memory allocation.</p>	<p>2.Definition of Information Technology IT Assets and its managements- Data –Access rules,confidentialityofdata,Back upprocedure.ITActinbrief,Defin edifferenttermsasmentioned in IT Act – Access , Address , Data , Digital signature , Electronic form , Electronic Gazette ,License, Electronic record ,License ,Private key, Public key etc</p> <p><b>Section II:</b> Definition, declaration, prototype of function. Local and global variable, User defined functions Storage classes, Recursion, Pointer and function, Call by value and Call by reference, Preprocessor</p>	<p>3.Data. Database. Database Management System, Concept of Data Models ( Network, Hierarchical ,Relational). Concept of RDBMS, RDBMS Terminologies : relation, attribute, domain, tuple, entities, DBA &amp; Responsibilities of DBA. Relational Model: Structure of Relational Databases, Relational Algebra</p> <p><b>Section II:</b> Concept of File ,Text and binary files, Opening and closing files, File opening mode- read, write, append, character and integer handling ( getc(), putc() , getw() , putw() ). Formatted input- scanf() ,sscanf() ,fscanf(),fread(),Formattedout put- printf(),sprintf(),fprintf(),fwrite()Functions- fseek(),ftell(), fflush(), fclose(), fopen(), rewind()</p>



11	SEM-III Linear algebra & Numerical methods	GEC – 1300C	2019-20	<p>1. Matrices, Matrix Transformations, Linear systems. Results on system of linear equations and invertible matrices (statements only), Solutions of Systems of Linear Equations, Gaussian Elimination method, Gauss-Jordan method, LU-Factorization method</p> <p><b>Section II:</b> 1.1 Introduction 1.2 Muller's method : Algorithm and examples 1.3 Regula – Falsi method : Algorithm .graphical representation and examples 1.4 Newton Raphson method : Algorithm .graphical representation and examples 1.5 Secant method : Algorithm and examples</p>	<p>2. Ring, Integral Domain, Field (only definitions), Vector Spaces, Subspaces Linear Dependence and Independence– Definition &amp; examples, Basis and Dimension, Rank and Nullity of matrix, Inner product space, Definition and examples, Properties of inner product, Ortho normal Basis in R, Gram-Schmidt process</p> <p><b>Section II</b> 2.1 Interpolation . Equally and Unequally spaced data 2.2 Definitions of forward difference ( ) .Backward difference ( ) and Shift operator (E) 2.3 Elementary results on 2.4 Fundamental theorem</p>	<p>3. Eigen values and Eigen vectors, Diagonalization, Cayley Hamilton theorem(Statement only) and examples.</p> <p>4. Definitions and Examples. The Kernel and Range of a Linear transformation, The Matrix of a Linear Transformation</p> <p><b>Section II:</b> 3. Introduction of numerical integration. General Quadrature formula (without proof). Trapezoidal rule (with proof) and examples. Simpson's rule (with proof) and examples. 4. Introduction of first order ordinary differential equation, Euler's method and examples, Euler's modified method and examples, Runge – Kutta method (second and fourth order) and examples</p>
12	Computer Instrumentation And Organization, Processor	GEC- 1301 C	2019-20	<p>1. Definition of sensors and transducers. Classification of sensors: Active and passive sensors. Specifications of sensor: (Accuracy, range, linearity, sensitivity, resolution, reproducibility). Temperature transducers: Resistance temperature detector (RTD), The roisters, Thermocouple (LM- 35 and AD590), optical sensor (LDR), displacement sensor (LVDT), Passive Infrared sensor (PIR), ultrasonic sensor, Hall effect transducer, and Proximity sensors.</p> <p><b>Section II:</b> CPU organization: Different registers organization Memory organization: Characteristics of memory systems. Cache memory, Memory Hierarchy, memory management (Segmentation, Paging).</p>	<p>2. Introduction to signal conditioning. Signal conditioning of passive sensors using bridge circuit: Wheat stone's bridge. Three OP-amp instrumentation amplifier, Filters: active and passive filters, Op- Amp based filters: Low Pass Filter, High Pass Filter, Band Pass Filter, Band reject filter.</p> <p><b>Section II:</b> Program development steps- Defining problem, Writing Algorithms, Flow chart Initialization checklist, Choosing instructions, Converting algorithms to</p>	<p>3. Digital to Analog Converter (DAC): Resistive divider, R-2R ladder. Parameters: (Linearity, resolution, accuracy). Analog to Digital Converter: Types of ADC: Flash, Successive approximation. Parameters of ADC (Linearity, resolution, conversion time, accuracy).</p> <p>4. Introduction, Digital MultiMate's, Digital Frequency Meter, Digital Tachometer, Digital pH Meter, Digital Phase Meter, Block Diagram of CRO, Generalized Data Acquisition System, Data Logger.</p> <p><b>Section II:</b> Introduction to assembler (NASM), Assembly directives, introduction to Programming (Flow chart, Algorithm, program). Assembly programs of Addition,</p>





				I/O organization: Need of I/O interface, IO mapped IO, Memory mapped IO, DMA concept, Serial bus interface (RS 232, USB), Parallel port, PCI bus, PCMCIA bus	assembly language programs. Assembly Language Programming Tools Editors, Assembler, Linker, Debugger Assembler directives and Operators	subtraction, multiplication, division, code conversion, Array processing (Finding largest-smallest number, arranging elements in ascending – descending order).
13	Introduction to RDBMS using MySQL and Object Oriented Programming Using C++	CC- CS- 1304C	2019-20	<p><b>Section I:</b> 1.Data Flow Diagram: concept of DFD, Symbols, Levels of DFDs, example. Entity Relationship Diagram: Concept of Entity, Attributes, Symbols, Types of relations, examples. Normalization: Forms of Normalization – 1NF, 2NF, 3NF, BCNF.</p> <p><b>Section II:</b> 1.Structure of C++ program, Input and output Streams, Memory management operators: new and delete, this pointer, Reference variables, Control Structures (looping and branching statements), Functions: inline function, default argument, function overloading.OOP Concepts: Data abstraction, Data Encapsulation, Inheritance, Polymorphism, Message Passing. 2.Inheritance: Concept, Definitions of base class and derived class, Types of inheritance (Single, Multiple, Multilevel, Hierarchical and Hybrid inheritance)</p>	<p><b>Section I:</b> 2.what is MySQL ,features of MySQL. Basic Data types in MySQL, Classification of Commands : DDL- Create, Alter, Drop, Truncate, Comment, Rename, DML- Insert,Update,Delete,Select.DC L-Grant,Revoke,TCL- Commit,Rollback, Save point Data Constraints: Primary Key, Foreign Key, Unique, NOT Null, Check, Default. Select statement with where, group by, order by clause.SQL Operators: Logical, Relational/Comparison, Special - In, Between, Like. SQL functions: Arithmetic, Conversion, Date and time, Aggregate Functions.</p> <p><b>Section II:</b> Class declaration, Access modifiers: public, private, protected, defining member functions (inside the class and outside the class), Static data members and member function.</p>	<p><b>Section I:</b> 3.Introduction to Sub Queries: Sub queries, Nested Sub query. Introduction to Joins: Simple/Inner Two tables Join, Left, Right, Outer join, Self join, Views, Indexes, Sequence. 4.Stored Procedures definition and concept. Structure and Syntax of Stored Procedures block. Stored Procedures variables, parameters, modes: IN,OUT, INOUT. Flow Control structures: if, case statements, Loops-Simple loop, while, repeat until Stored Procedures: Creating, Calling, Modifying, Deleting/Dropping procedures Introduction to Cursors, Trigger and its types.</p> <p><b>Section II:</b> Constructor and Destructor: Definition and features of constructor, Types of constructor, Definition, syntax and use of Destructor Operator overloading: Concept, Rules for operator overloading, Unary and Binary Operator overloading</p> <p>3. Polymorphism: Definition of polymorphism, Types of polymorphism, virtual function, pure virtual function, Abstract class.</p>



					Array of object, friend function and friend class.	
14	Computational Geometry & Operations research	GEC – 1300D	2019-20	<p><b>I.</b> Introduction. Representation of points. Transformations and matrices. Transformation of points. Transformation of straight lines. Midpoint transformation. Transformation of parallel lines. Transformation of intersecting lines. Transformation: rotations, reflections, scaling, shearing. Combined transformations. Transformation of a unit square. Solid body transformations.</p> <p><b>Section II:</b></p> <p><b>2.</b> Basics definitions. Solution of L.P.P by Simplex method and examples. Solution of L.P.P by Big-M method and examples. Definition of Dual Problem. Relationship between solutions of primal and dual problems.</p> <p><b>4.</b> Basics definitions. Saddle point and examples. Algebraic method for <math>2 \times 2</math> size game and examples</p>	<p><b>2.</b> Introduction. Threedimensional—Scaling, shearing, rotation, reflection, translation. Multiple transformations. Rotation about—an axis parallel to co ordinate axes. an arbitrary axis in space. Reflection through—co ordinate planes, planes parallel to co ordinate planes, arbitrary planes. Affine and perspective transformations.</p> <p><b>Section II:</b></p> <p><b>3.</b> Vogel's approximation method and examples. MODI method and examples. Maximization in transportation problem and examples. Unbalanced transportation problem and examples. Introduction to Assignment problem. Hungarian method and examples</p>	<p><b>3.</b> Transformation and homogeneous co ordinates. Translation. Rotation about a arbitrary point. Reflection through and arbitrary line. Projection—a geometric interpretation of homogeneous co-ordinate Overall Scaling. Point at infinity. Orthographic projections. Axonometric projections. Oblique projections. Single point perspective transformations. Van points.</p> <p><b>Section II:</b></p> <p><b>1.</b> Basics of operation research. Different definitions of operation research. Characteristics, scope, limitations of operation research</p>
15	Communication Principles AND 8051 Microcontroller Interfacing. Programming	GEC-1301 D	2019-20	<p><b>Section I:</b></p> <p><b>1.</b> importance of communication, elements of communication system, electromagnetic spectrum, types of communication. (serial and parallel), concepts of communication system: signal bandwidth, channel bandwidth, data rate, baud rate, Nyquist theorem, signal to noise ratio, and channel capacity, error handling code- hamming code, Shannon theorem.</p> <p><b>4.</b> Introduction to mobile communication, cellular concept, working of GSM, handover, introduction to GPRS. Introduction to RFID, Zigbee, Bluetooth and Wi-Fi (comparison based on range, data rate,</p>	<p><b>Section I:</b></p> <p><b>2.</b> basics of modulation and demodulation introduction to modulation techniques: analog modulation (amplitude, frequency and phase), digital modulation, PAM, PCM, Delta modulation, modem -concept of ask, fsk, bpsk, qpsk and block diagram of modem using fsk.</p>	<p><b>Section I:</b></p> <p><b>3.</b> study of multiplexing and multiple access techniques: space division multiplexing, frequency division multiplexing, code division multiplexing, spread spectrum techniques: DSSS, FHSS, introduction to multiple access and corresponding access types: FDMA, CDMA.</p> <p><b>Section II:</b></p> <p>Timer and Counter: Timer and Counter</p>



				<p>frequency, power).</p> <p><b>Section II:</b> Comparison of Microcontroller &amp; Microprocessor, Study of 8051 and its Family (89C51, DS5000, 8031, 8032, 8052, 8751, Phillips RD2, 89C51VRD2). Architecture of 8051: Internal Diagram of 8051 and Study of Internal Blocks, Reset and Clock, Registers, Flags and Internal Memory, SFR, I/O Ports.</p>	<p><b>Section II:</b> Study of 8051 Instruction Set and Addressing Modes, Data transfer, Arithmetic, Logical, JUMP, Loops &amp; CALL instructions, Bit manipulation Instructions.</p> <p>4. Interfacing ADC, DAC, Stepper Motor, LCD, DC motor (PWM), Respective programming through embedded C. Study of advance micro controllers (ARM &amp; PIC): Features and applications</p>	<p>Timer modes. Programming the timers in Mode 1 using assembly and C. Time delay generation. Serial Port: Serial port of 8051, RS-232 standard and C MAX-232. Baud rate in 8051, programming for transmitting character through serial port using assembly and C.</p>
16	Introduction to Data Structure Using C++ and Cyber Security	CC-CS-1304D	2019-20	<p><b>Section I:</b> 1. Definitions: Data types, Data Object, Data structure, Abstract Data Type (concept), Data Structure classification, Algorithm Efficiency: Complexity, Big O notation, Array: Definition, Types of array (one dimensional and multidimensional), sparse matrices. 2. Stack: Definition of Stack, Operations on Stack, Static Implementation of stack Applications of stack: Recursion, inter conversions between infix, prefix and postfix expressions. Queue: Definition of Queue, Operations on Queue, Static Implementation of Queue, Types of Queue: Linear, Circular and Priority queue, Applications of Queue.</p> <p><b>Section II:</b> 1. Definition, Types of Network, Topologies, Network devices, Internet, Search Engines, Web Browsers, OSI Model, TCP IP Model, IP address scheme, switching techniques. 2. Security Threats: Definition, Types of Threats - Virus, Worms, Trojan Horse, Malware, R an</p>	<p><b>Section I:</b> Searching: Linear search and binary search Sorting: Bubble Sort, Selection Sort, Insertion sort, Merge Sort</p> <p><b>Section II:</b> 1. Introduction to Cyber Security: Definition, Importance, Computer ethics, Hacker, Hacking phases, Hacker classes, Mobile Device Security, File Security, Password Security, Browser Security, Email Security, Encryption, Decryption, Digital Signature. 3. Firewall, types of Firewall, spoofing, Firewall, types of firewall Antivirus-Definition, Types, features, advantages.</p>	<p><b>Section I:</b> Linked List: Concept of Linked List, Operations on Linked List, Implementation of Linear Linked List, Types of Linked List, Implementation of stack and queue using linked list Trees: Definition of tree, Tree terminologies, Types of Tree, Tree Traversal (in order, preorder, post order).</p> <p><b>Section II:</b> 4. Computer Forensics, Steganography, elements of information security and Introduction to Kali Linux Access Controls: Overview of Authentication and Authorization, Overview of Intrusion Detection Systems and Intrusion Prevention Systems, Wireless Network Security- Components of wireless networks, Security issues in wireless, Wi-Fi Security, Risk of Using Unsecured Wi-Fi, Bluetooth and its security Cyber Security Laws: Security Laws, Intellectual Property Rights, Security</p>



				software. Identify the fetch, , Web application threats. Torrent and infected websites,	limitations. difference between Firewall and Antivirus. Definition of attack, Types of Attacks, DoS attack, phishing.	Audit. What is cyber crime and types of crime.
17	Core Java and Operating system	DSC-1305E	2020-2021	<p><b>Section I:</b>  1.A Short History of Java, Features of Java, Java tools-JDK, JRE. Structure of java program compilation and execution of program, JVM, Types of Comments, Data Types, Final Variable Type Conversions-implicit and explicit conversion . Accepting input from console (Using canner class and command line arguments).  4. Exception Handling- Concept, types- Checked and unchecked, try and catch block, multi plecatch, Try-catch –finally block, throw and throws clause, finally clause, Multithreading- What are threads?. difference between process and thread. Life cycle of thread, methods of thread class, runn able interface,</p> <p><b>Section II;</b>  1.Types of operating system, Operating system services, Protection: input output, memory and CPU protection. System calls: types of system calls and system call implementation, System programs and application programs.  4.  File concept .access methods- sequential and direct .file types and operations, Directory structure-single level, two level, tree structure, acyclic graph ,general graph directory structure , Allocation method-contiguous, linked and indexed. Definition of dead lock, characteristics Dead lock prevention. detection and recovery</p>	<p><b>Section I:</b>  2.Control statements, For- each loop, Var args . Declaring ID, 2D array, Defining Classes, objects and method-method over loading. Array of Objects, 4. is Alive() and join() methods. Thread priorities . Running multiple threads .Synchronization and inter thread communication wait() , notify(), notify All() methods .</p> <p><b>Section II:</b>  2.Process concept, Process states, Process control block (PCB), Context switching, Threads, concept of multithreads, benefits of thread sand types of threads, Process scheduling: scheduling objectives, types of schedulers, scheduling criteria, schedule in algorithms- Preemptive and non- preemptive.</p>	<p><b>Section I:</b>  3.Package-Introduction to all predefined packages, User Defined Packages. Access Specifies. Inheritance-Types of Inheritance-single, multilevel, hierarchical inheritance, Method Overriding, Super Keyword, final keyword, Abstract class and abstract methods, Defining and Implementing Interfaces.</p> <p><b>Section II:</b>  3.  Paging and virtual memory .demand paging .locality of reference, page fault ,dirty page/ dirty bit, page replacement policies FIFO, optimal, LRU, MFU, Disk structure, Disk scheduling- FCFS,SSTF,SAN,LOOK,CSCAN,CLOOK</p>



18	Data communication and Software Engineering with UML	DSC-1306E	2020-2021	<p><b>1.</b>Data Representation, Data Flow-Simplex, Half-duplex, and Full-duplex, Networks: Definition, Advantages and disadvantages, Categories of Networks-LAN, WAN, MAN, Network Architecture-Client-Server and Peer to Peer.</p> <p><b>4.</b> Delta Modulation (DM), Data link layer: Design issues, Framing, error Detection and Correction.</p> <p><b>Section II:</b></p> <p><b>1.</b>Definition of software, definition of software engineering, characteristics of software, System Development Life Cycle (SDLC), phases of SDLC, Software process models: Traditional models- Water fall model ,Proto typing model, Spiral Model, Introduction to Agile software development-concept, advantages, types- scrums, extreme programming(XP).</p> <p><b>4.</b> Interaction diagrams- over view, Sequence Diagram- concept, activation, example, Activity diagram- concept, activities, actions, decisions, control nodes, fork and join node, example.</p>	<p><b>2.</b>Transmission Media Guided Media- Twisted- Pair Cable, Coaxial Cable and Fiber Optic Cable, Unguided Media: Radio Waves, Microwaves, Infrared Waves, Transmission Modes: Parallel, Serial- Asynchronous, Synchronous, Isochronous</p> <p><b>Section II:</b></p> <p><b>2.</b> Software requirements specification (SRS)- need of SRS, characteristic of SRS, structure of SRS, Types of requirements - functional and non- functional.</p>	<p><b>3.</b> Multiplexing, Switching: Circuit switching- data gram and virtual Switching, Packet Switching and Message Switching, Network Devices: Repeater, Hub, Bridge, Switch, Router, Gateway, Brouter, Modem, Protocols and Standards, Protocols: concept, syntax, semantics, Timing, Standards.</p> <p><b>Section II:</b></p> <p><b>3.</b> Introduction to UML- concept of UML, advantages of UML, applications of UML, Classification of UML diagrams, Use case diagrams- over view, identifying actors and use cases, communication and relationships, example, Class diagrams: classes and objects, association and links, multiplicity, inheritance, example, State machine diagram-states, event, composite state, transition, activity, and example.</p> <p><b>4.</b>Software Testing over view- concept, Testing fundamentals, Types of testing– Unit testing, Acceptance testing (<math>\alpha / \beta</math>), Integration testing, Black box testing, White box testing.</p>
19	Vb.net and E-Commerce	DSC-1307E	2020-2021	<p><b>Section I:</b></p> <p><b>1.</b>Event driven &amp; sequence driven programming, Introduction to c# . . net frame work architecture, Assembly Name space, Garbage collect or JIT compilers.</p> <p><b>Section II:</b></p> <p><b>1.</b>History, Overview, Definition of E-commerce, Scope &amp; Goals of E-Commerce, Advantages and Disadvantage of E-commerce, Applications of E-commerce, Challenges of E-commerce, Roadmap of e-commerce in India, Traditional commerce Vs E-commerce.</p>	<p><b>Section I:</b></p> <p><b>2.</b> Variables, expressions, constants, Data Types, Operators, implicit &amp; explicit conversions, Conditional statements, Loop statements, Unconditional statements, Functions, Procedures</p> <p><b>Section II:</b></p> <p><b>2.</b> Meaning of EDI, History of EDI, EDI Working Concept</p>	<p><b>Section I:</b></p> <p><b>3.</b>Class &amp; objects, Constructors, Inheritance, Polymorphism.</p> <p><b>4.</b> Different controls in win form – Forms, textbox, labels, buttons, radio buttons, check box, combo box, list box, Date time picker, Important properties of controls, Important event so feach control, Menus, built in dialog box –input box, message box, Mouse events –click, double click, enter, hover, leave, move, Keyboard events – key press, key down, key-up .</p>



				<p>4. Secure Transaction concept- Authentication &amp; Authorization. Privacy on Internet, Computer Crime Types and laws. Viruses- Types of Attacks , Vulnerability of Internet Sites. Denial- of-Service attacks.</p> <p>Cryptography - Encryption, Decryption, SSL-SET, Firewall. Digital Certificates. Digital signatures. World Wide Web, Uniform Resource Locator. Web Browsers. Email. Voicemail. Web Search Engines.</p>	<p>.EDI Model, EDI Standards. Implementation difficulties of EDI. Advantages and Disadvantage of EDI. Ecommerce Business Models (B2B,B2C,C2C.C2B.B2G.G2G,G2C), E-commerce marketing and business strategies. Social networks and online communities, History and Development. Use of Internet. Domain Names. Internet Service provider.</p>	<p><b>Section II:</b></p> <p>3. Electronic Payment concept. Steps for Electronic Payment. Types of E- Payment Systems-Prepaid, Postpaid, Electronic fund Transfer. Net Banking. Case Study: List out the Websites dealing with E-Commerce. Survey of ATM Center. Create Web site with minimum details. Logon to trade Website and make a trial order for purchase of an item.</p>
20	PHP programming	SEC-III	2020-2021	<p>1. What does PHP do? .A walk through PHP-forms, databases, graphics. Language basics-lexical structure- case sensitivity, statements and semicolons, white spaces and line breaks, comments, literals, identifiers, keywords, Data types- integers, floating point numbers, strings, Booleans, arrays. Variables- variable references, scope, garbage collection. Expressions and operators. Flow control statements- if, switch, while, for, for each .try...catch, declare, exit and return, go to.</p>	<p>2. Calling a function, defining a function. Variable scope, function parameters, Return values. Variable functions. Anonymous functions. Quoting string constants. Printing strings, cleaning strings. Comparing, manipulating and searching strings, Regular expressions</p>	<p>3. Indexed versus associative arrays. Identifying elements of an array. Storing data in arrays. Multi dimensional arrays. Extracting multiple values. Converting between arrays and variables. Traversing arrays, Objects- terminology, creating an object, accessing properties and methods. Declaring a class- methods, properties, constants, inheritance, interface.</p>
21	Advanced Java and Data warehousing and mining	DSE-1305F	2020-2021	<p><b>Section 1:</b></p> <p>A wt- What is AWT? classes hierarchy, windows fundamentals Frame Windows Event Classes.</p> <p>Mouse Event Class, Action Event Class, Window Event Class, Event Listener Interface: Mouse Listener, Action Listener, Window Listener and Key Listener, AWT Controls: Labels, Text Field, Pushbuttons, Layout</p>	<p><b>Section 1:</b></p> <p>Introduction of servlet: How servlet work, model diagram. Uses of servlet, Life cycle of servlet, Servlet API: packages- javax.servlet and javax.servlet.http . Session Tracking Mechanisms. Http Session, Cookies, URL.- Rewriting.</p>	<p><b>Section 1:</b></p> <p>Introduction, Jsp Life Cycle, Jsp Implicit Objects &amp; Scopes, Jsp Directives 1.page2.include3.taglib . Jsp Scripting Elements- 1.declaratives2.scriptlets3. expressions . Simple application using JSP. Difference between JSP and Servlet.</p> <p><b>Section II:</b></p>



				<p>Managers (Flow Layout, Border Layout, Grid Layout, Card Layout). Swing- What is Swing? Difference between AWT and Swing.. The MVC Architecture and Components –J Frame, J Button, J Label, J Text, J Text Area, J Check Box and J Radio Button, J List, J Combo Box, J Menu, J tabbed Pane , J Scroll Bar , Dialogs (Message, confirmation, input. 2.What is JDBC? Steps for connectivity between Java program and data base ,Type of drivers. Simple program- data base operations like creating tables, CRUD (Create, Read, Update, Delete) operations using SQL.</p> <p><b>Section II:</b> Classification, Classification Requirements, Classification vs Prediction. Issues related to Classification and Prediction . Decision tree . Prediction , Regression analysis . Clustering: What Is Cluster Analysis? Different Types of Clustering, K-means: The Basic K-Means Algorithm</p>	<p>Hidden- Form Fields.</p> <p><b>Section II:</b> 1.What is Data Ware housing?. How Data ware house works? ,Why a Data Ware house is Separated from Operational Data bases. Data Ware house Applications. Types of Data Ware house . Difference between Data Ware house (OLAP) and Operational Database(OLTP) .</p>	<p>2.What is data mining?. Process of knowledge discovery in databases (KDD), Getting to Know Your Data. Data Objects and Attribute Types, What Is an Attribute, Nominal Attributes , Binary Attributes, Ordinal Attributes, Numeric Attributes , Discrete versus Continuous Attributes. 3. Data Preprocessing: An Overview, Data Quality: Why Preprocess the Data?. Major Tasks in Data Preprocessing, Data Cleaning (Missing Values, Noisy Data) . Data integration . Data Transformation . Data reduction. Data Discretization .Association Rule Mining. Market basket analysis. Apriori algorithm.</p>
22	Computer Networks and C# and introduction to ASP.Net	DSE-1306F	2020-2021	<p><b>Section I:</b> 1.Protocols- Sliding window protocol: on e bit sliding window protocol, protocol using Go Back N, protocol using selective repeat. Network Layer: Design issues, Concept of Routing. 4. Application layer: Function, Protocols- Domain name system (DNS), Hyper text transfer Protocol (HTTP), Simple Mail Transfer Protocol (SMTP), Telnet, File Transfer Protocol (FTP). Network security: Security concept and services, Message Authentication, Digital Signatures and</p>	<p><b>Section I:</b> 2. Routing Algorithms (Shortest Path, Flooding, Distance Vector Routing). Congestion Control Algorithms: Leaky Bucket, Token Bucket , transport Layer: services: connection oriented and connection less services, Transport Layer Primitives: listen, connect, send, receive, disconnect.</p>	<p><b>Section I:</b> 3.Session layer: Services: dialog management, synchronization, activity Management, exception handling Remote procedure calls (RPC), Presentation Layer: Services- Translation, compression, encryption, Cryptography-Concept, Symmetric key and A symmetric key Cryptography. <b>Section II:</b> 3.Connection to Data base, Table, Queries, Create and Modify Report, Formatting</p>



				<p>Entity authentication.</p> <p><b>Section II:</b></p> <p>1.Errors- types of errors. Structured Exception – Try Catch End Try, finally, throw, Unstructured Exception–On error Go To, resume, resume next, Tracing Errors– Break Point, watch window, quick watch window, autos.</p>	<p>Protocols: TCP, UDP.</p> <p><b>Section II:</b></p> <p>2.Data base: Connections, command, Data adapters, and data sets. Connection to data base using MS- Access, SQL. Server, Data binding with controls like Text Boxes, List Boxes, Data grid etc. Data from wizard, Data validation.</p>	<p>Fields and inserting Header, Footer, Group, Details Working with formula fields, Parameter fields, Working with Multiple Tables.</p> <p>4. Introduction to ASP.NET, Working with web forms: Buttons, Text Boxes, Labels, Check Boxes, Radio Buttons, Tables, Panels, Images, Image Buttons, List Boxes, Drop- Down Lists, Hyper links and Link Buttons.</p>
23	Linux OS and Artificial intelligence and Expert system	DSE-1307F	2020-2021	<p><b>Section-I:</b></p> <p>1.What is an OS? What is Linux, history of Linux, Linux distribution, The shell, kernel, Linux file system, login, logout, Different general purpose utility commands(GPU)-cal, date, bc, who, Concept of directory, home directory, directory handling commands- PWD, cd, mkdir, rmdir, ls, relative and absolute path, Basic file attribute smet a chracters, Access permission chmod command, File handling commands- cat,cp, mv, rm, lp, man, pipe.</p> <p>4.Linux shells, shell scripting, running a shell script, Statements- read, echo, exit, expr, Conditional statements- test, if, case, Looping statements-while, until, for, Positional parameters- set, shift.</p> <p><b>Section-II:</b></p> <p>1.Definition of Artificial Intelligence, History of Artificial Intelligence, Goals of A.I., Contributors of A.I., Branches of A.I., Applications of A.I., Why Artificial Intelligence, Advantages of A.I., Disadvantages of A.I., Types of Artificial Intelligence: Type1, Type2.</p>	<p><b>Section-I:</b></p> <p>2.What is a filter, head, tail, sort, grep, sed, awk, Regular expressions and its types, Environment variables- PATH,USER,HOME,UID,TE RM,SHELL, Concept of process, PID, PS, KILL, FREE.</p> <p><b>Section-II:</b></p> <p>2. What is intelligence, Types of Intelligence, Components of Intelligence- Reasoning, Learning, Problem Solving, Perception, Linguistic Intelligence, A.I. Agents and environment – concept, definition of agent, definition of environment, Structure of A.I. agent, Rules for A.I. agent, Rational Agent- PEAS representation (Case study of Self Driving Car) examples.</p>	<p><b>Section-I:</b></p> <p>3.What is the VI editor- command mode, insert mode, last line mode, VI editing commands, moving within a file, saving and closing the file, Command mode movement, command mode-making changes, repeating VI actions.</p> <p><b>Section-II:</b></p> <p>3. Concept, Search algorithm terminologies: i) Search- Search Space, Start State, Goal State, ii) Search Tree, iii) Actions, iv) Transition Model, v) Path Cost vi) Solution vii) Optimal Solution, viii) Problem and Problem Space, Types of Search Algorithms: Uninformed- Breadth First Search, Depth First Search, Informed: Heuristic Search – i) Generate and test method , ii) Hill Climbing, Natural Language Processing: concept, definition, natural language processing and understanding, NLP analysis stages.</p> <p>4. What are expert systems, Features of</p>





				4.ii) Inference Engine – Definition, forward chaining, backward chaining, iii) User Interface, Development of E.S., Limitations of E.S., Applications of E.S.	Turing test.	expert Systems. Components of Expert System- i) Knowledge base- definition, components of Knowledge base, Knowledge representation , Knowledge Acquisition.
24	Android Programming	SEC-III	2020-2021	2. Understanding Intent, Activity, Activity Lifecycle and Manifest, Creating Application and new Activities Expressions and Flow control, Android Manifest Simple UI- Layouts and Layout properties. Fundamental Android UI Design Introducing Layouts Creating new Layouts, Drawable Resources Resolution and density independence (px, dip, dp, sp, sp) XML Introduction to GUI objects viz. Push Button Text /Labels Edit Text, Toggle Button, Weight Sum Padding Layout Weight	1. What is android, setting up development environment. Dalvik virtual machine & ask file extension. How to setup Android Development Environment . Android development Frame work- Android- SDK, Android Project Frame work 4. What is Menu? Custom Vs. System Menus Creating and Using Hand set menu Button (Hardware) What are Android Themes. What is Dialog? How to create an Alter Dialog? What is Toast in Android? List & Adapters Manifest.xml File Update.	3. <b>Event driven Programming in Android</b> (Text Edit. Button clicked etc.) Creating as splash screen. Event driven Programming in Android . <b>Android Activity Lifecycle</b> - Creating threads for gaming requirement Understanding the Exception handler. <b>Different controls in win form</b> – Forms, textbox, labels, buttons, radio buttons, check box, combo box, list box, Date time picker. Important properties of controls, Important events of each control, Menus, <b>built in dialog box</b> – input box, message box, <b>Mouse events</b> – click, double click, enter, hover, leave, move, <b>Keyboard events</b> – key press, key down, key-up
25	SEM - I English for Business Communication	AEC C-A	2021-22	1. To understand the concept, process and importance of communication. 2. To gain knowledge of media of communication. 3. To develop skills of effective communication - both written and oral. 4. To make students familiar with information technology	1. Introduction information technology	1. Introduction to skills of effective communication - both written and oral.
26	Mathematics- Discrete Mathematics & Algebra	GEC-1300 A	2021-22	<b>Section 1:</b> <b>1. Counting Principle:</b> Counting : Addition & Multiplication principle, Permutation & Combination: Cardinality of finite set, Cardinality of union of sets (Addition		<b>2. Recurrence relations</b> Linear Recurrence relation with constant coefficient, <b>3. Logic :</b> Propositions & Logical connectives :



	Theory			<p>principle) .Principle of inclusion &amp; exclusion, examples Combinatorial Arguments, Pigeonhole Principle (Statement Only),Examples.</p> <p><b>4.Fuzzy Sets:</b> Introduction: Fuzzy numbers, Fuzzy set.Classical logic: Applying truth values-continuous variable, Linguistic variables</p> <p>Types of Fuzzy Logics: Advantages of Fuzzy Logic :Disadvantages of Fuzzy Logic.</p> <p><b>Section II:</b></p> <p>4.Binary operation :definition, Semi group &amp; Monoids: definition &amp; examples, Group: definition &amp; examples, simple properties of groups, Sub-group: definition &amp; examples.</p>		<p>Definition, Types of Propositions, Truth values &amp; Truth Tables. Tautology &amp; Contradiction. Logical equivalence. Rules of inferences. Valid arguments &amp; proofs. Methods of proofs: Direct &amp; indirect, Duality of the statement, Predicates &amp; Quantifiers.</p>
27	Electronics	GEC-1301 A	2021-22	<p><b>Section I:</b></p> <p>Definition of active and passive elements Resistors: Classification, color-code, specifications of resistors.Types of resistors:- Linear Resistors (Fixed):-Carbon composition, carbon film, wire wound. Linear resistors (Variable): -Wire wound, Potentiometer, Preset.Non-Linear resistors:- Thermostats, LDR and Varistors.</p> <p><b>Section II:</b></p> <p>Different types of number system (Decimal, Binary, Octal, Hexa decimal Number system. Inter conversion From one System to another) and codes (BCD code, Gray code, Excess 3code, ASCII code, EBCDIC code).Concept of parity, Signed</p>	<p><b>Section I:</b></p> <p>Types of capacitors: -Fixed electrostatic capacitors:- ceramic, mica, paper, etc Fixed electrolytic capacitors:- Aluminum and Tantalum. (Construction of electrolyte Capacitor).Variable capacitors:-Air dielectric capacitor and Trimmers. Inductors and Transformers: Inductors:-Definition, symbol, Inductance, Inductive reactance (XL), Types of Inductors:- Air core, Iron core and ferrite core inductors.</p> <p><b>Section II:</b> Logic gates, Multiplexer, Demultiplexer, tree multiplexing, tree demultiplexing.</p>	<p><b>Section I:</b></p> <p>Applications-Opto coupler, dot matrix display of LED, 7- segment display. Relation between <math>\alpha</math> and <math>\beta</math>.DC load line and Q point, potential divider Biasing, Concept of transistor as an amplifier and transistor as switch.</p> <p><b>Section II:</b></p> <p>Concept of sequential circuits, Flip-flops: RS, Clocked RS, JK, Master Slave JK, D Flip- flop,Counter-Asynchronous, up/down, Decade, Synchronous, Ring Counter, Johnson counter.</p>



28	Descriptive statistics-I and Discrete probability distributions	GEC-1302 A	2021-22	<p><b>Section I:</b> Methods of sampling: Simple Random Sampling and Stratified Random Sampling (description only). Data Condensation: Raw data, Attributes and variables, discrete and Continuous variables, classification and construction frequency distribution. Graphical Representation: Histogram, Frequency polygon, Frequency curve, Ogive curves and their uses. Examples and Problems.</p> <p>2. Median: computation for ungrouped and grouped data, Graphical method, merits and demerits. Mode: Definition, computation for ungrouped and grouped data, graphical method, merits and demerits. Quartiles: Definition, computation for ungrouped and grouped data graphical method.</p> <p>3. Measures of skewness: Types of skewness. Pearson's and Bowley's coefficients of skewness, Measures of skewness based on moments. Measures of kurtosis: Types of kurtosis. Measures of kurtosis based on moments.</p>	<p><b>Section II:</b> power set (sample space consisting at most 3 sample points). Classical (apriori) definition of probability of an event, equiprobable sample space, simple examples of probability of an event based on permutations and combinations. axiomatic definition of probability with reference to finite and countably infinite sample space.</p>	<p><b>Section II:</b> Definitions: discrete random variable, probability mass function (p.m.f.), cumulative distribution function (c.d.f.), properties of c.d.f., median, mode and examples.</p>
29	Computer Science	CC-CS-1303 A	2021-22	<p><b>Section I:</b> <b>Operating System concepts:</b> Why Operating System, History of operating system, Functions of Operating System, Types of Operating System, Batch O.S., Multiprogramming O.S., Time Sharing O.S., Personal Computers O.S., Network O.S.</p> <p><b>MS PowerPoint:</b> MS Power point - Introduction to PowerPoint, Creating a Presentation, PowerPoint views, Slide show, Formatting slides, Slide transition &amp;</p>	<p><b>Section I:</b> <b>MS Excel and MS Excel- modes.</b> Move/Copy text, Insert/Delete Rows and Columns. Formatting a Worksheet, Print the workbook, Charts, Naming Ranges, and Conditional Formatting, Filtering the data from database, Drawing</p>	<p><b>Section I:</b> <b>MS Access:</b> MS Access-Create Tables, data types, Field properties, Validation rules, Create Query, Create Forms, Create Reports.</p>



				adding special effects, Inserting pictures, sound.chart.	toolbar, Freeze Panes, Splitting the worksheet.Goal Seek ,Pivot table and Hyperlinks.Functions: Date and Time function, Statistical	
30	Sem II English Communication Skills-II	AEC C-B	2021-22	1.To understand the concept, process and importance of communication. 2.To gain knowledge of media of communication. 3.To develop skills of effective communication - both written and oral. 4.To make students familiar with information technology	I.Introduction information technology	I.Introduction to skills of effective communication - both written and oral.
31	Mathematics- Graph Theory & Calculus	GEC- 1300 B	2021-22	<b>Section I:</b> Definitions : walk, trail, tour, path and circuit. Definitions of connected, disconnected graphs Dijkstra's shortest path algorithm Connectivity : Isthmus, cut-vertex, vertex connectivity and edge connectivity		
32	Electronics : Analog electronics - II and Circuits-II	GEC- 1301 B	2021-22	<b>Section I:</b> <b>Bipolar Junction Transistor:</b> Structure and working of bipolar junction transistor: CB, CC, CE configurations, CE mode characteristics, Relation between $\alpha$ and $\beta$ , DC load line and Q point, potential divider Biasing, Concept of transistor as an amplifier and transistor as a switch	<b>Section II:</b> Instruction Set and Programming of 8085 Microprocessor (10) Instruction Set of 8085, Assembly Language Programs (ALP) for Addition, Subtraction, Multiplication, Division, Data transfer, Block Transfer.	
33	Statistics: Descriptive statistics-II	GEC- 1302 B	2021-22	<b>Section I:</b> Concept of partial correlation. Definition of partial correlation coefficient and its formula. 3.8 Properties of partial correlation coefficient. 3.9 Examples and problems		



34	Computer science: Introduction to computers and programming using C-II	CC-CS-1303 B	2021-22	<p><b>Section I:</b>  <b>Introduction to HTML:</b>  HTML Documents, Basic structure of an HTML document, Creating an HTML document, Markup Tags, Heading-Paragraphs, Line Breaks, HTML Tags.</p> <p><b>Section II:</b>  Arrays and strings:  Array –One dimensional arrays –Declaration of 1D arrays –Initialization of 1D arrays – Accessing element of 1D arrays –Reading and displaying elements  Two dimensional arrays –Declaration of 2D arrays –Initialization of 2D arrays – Accessing element of 2D arrays –Reading and displaying elements  Initializing strings, Reading string  string handling functions (strcpy(), strcmp(), strcat(), strlen(), strrchr())  Programming Examples</p>	<p><b>Section I:</b>  Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames Working with Hyperlinks, Images and Multimedia, Working with Forms and controls</p>	<p><b>Section I:</b>  Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute selector), CSS Color, Creating page Layout and Site Designs.</p>
35	SEM-III Maths: Linear algebra & Numerical methods	GEC-1300 C1 C2	2022-23	<p>The Kernel and Range of a linear transformation  4.3 The Matrix of a linear transformation</p>	<p>Simpson's <math>\frac{1}{3}</math>rd rule (with proof) and examples  3.5 Simpson's <math>\frac{3}{8}</math>th rule (with proof) and examples</p>	
36	Electronics : Instrumentation	GEC-1301 C1	2022-23	<p><b>CPU Organization</b>  Register based CPU organization, stack organization: concept of PUSH, POP, Top of</p>	<p>Stack and Stack pointer, Ascending and Descending stack, Register stack, Memory stack.</p>	



	Computer organization	GEC-1301 C2				
37	Computer: Introduction to RDBMS using MySQL OOP Using C++	CC-CS-1303 C1 & C2	2022-23	MySQL Sub-queries and Joins  Introduction to Sub Queries: Sub queries, Nested Sub query. Introduction to Joins: Simple/Inner	Two table Join, Left, Right, Outer join, Self join. Views, Indexes, Sequence. Introduction to Cursors and Trigger	
	SEC: Skill Enhancement course-I Introduction to SQLite	SEC-BCS D	2022-23	Downloading and installing SQLite.	Create, open, drop database files	Insert, Update, Delete Queries Select, Where, LIMIT, OFFSET, Count, Group By SQLite operators, functions
38	SEM-IV Maths: Computational Geometry Operation Research	GEC-1300 D1 GEC-1300 D2	2022-23	Solution of L.P.P by Simplex method and examples 2.3 Solution of L.P.P by Big – M method and examples 2.4 Definition of Dual Problem	Algebraic method for 2 × 2 size game and examples 4.4 Arithmetic method for	2 × 2 size game and examples 4.5 Principal of dominance, Dominance method and examples
39	Electronics : 8051 programming, interfacing Raspberry	GEC-1301 D1 GEC-	2022-23	Section I: Introduction to Microcontroller 8051 Comparison between 8051, AVR, PIC. Applications of microcontroller. Section II: Introduction to Single board computer: Basics of Single board computer. Introduction to	Section I: Facilities in 8051 Serial Port: Serial port of 8051, RS-232 standard and IC Section II: Block diagram of Raspberry Pi-3B+, 4, Functions of each	Section I:  <b>Real World Interfacing</b> Programming through embedded C: Interfacing with LED, Liquid Crystal. Section II: Benefits of Operating system, different



	Pi	1301 D2		ARM Cortex Processor, Raspberry Pi Series and Model, Comparison of various models of Raspberry Pi, Detailed specifications of Raspberry	block. features of Broadcom Basic: LED and Switch, LCD, Relay and Buzzer Advanced: Internal: Bluetooth,	types of OS, Overview of Raspbian OS, OS Installation, Configuration of Raspberry Pi, Installation of libraries, Basic Python Programming
40	Computer: Data structure using C++ Cyber security essentials	CC- CS- 1303 D1 & D2	2022-23	<b>Big O notation</b>  Computer Forensics, Steganography, elements of information security and	Introduction to Kali linux Access Controls: Overview of Authentication and Authorization.	Overview of Intrusion Detection Systems and Intrusion Prevention Systems
41	Skill Enhancement course-II Python Programming	SEC- BCS D	2022-23	<b>Introduction to python:</b> What is python? , Applications of Python, Why Python? Installation of python, First program in Python, Comments and Doestrings in Python . <b>Functions:</b> Defining a function, Calling a function, Function arguments, Default parameter value, Anonymous function : Lambda function(why use lambda, syntax and examples of lambda). Data visualization in python: Pandas packages (NumPy and matplotlib libraries)	Looping Statements: for loop, while loop , Nested loops Control Statements: break, continue and pass String Manipulations: Accessing strings, Basic operations, String slices. Functions and methods Set: introduction and methods of set	Python collections : list, Tuple, set and dictionary List: Introduction, Accessing lists, change item value in list, loop through list, methods Tuple: Introduction, Accessing tuples, change item value in tuple , loop through tuple and methods of tuple
42	EVS	AEC C-B	2022-23	1:Need for public awareness, Concept of sustainability, Sustainable development and it's goals with Indian context.	2:Concept of an ecosystem, Structure and function of an ecosystem, Producers,	consumers and decomposers, Energy flow in the ecosystem, Ecological succession



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