NEP Structure for Under Graduate Programme Bachelor of Computer Applications

Semester	Subject Type	Paper Code	Paper Name	Subject Name	Lectures	Practical	Credits
I	Major -1	GVM_BCA_CSA-100	Problem Solving and Programming	Computer Application	3	1	4
	Minor - 1	GVM_BCA_MAT-111	Elementary Mathematics	Mathematics	4	0	4
	Multidisciplinary -1	GVM_BCA_Com-133	Marketing for Biginners	Commerce	3	0	3
	AEC - 1	GVM_BCA_ENG-151	Communicative English Spoken and Written	English	2	0	2
	SEC - 1	GVM_BCA_CSA-142	Python Programming	Computer Application	1	2	3
	VAC- 1	GVM_BCA_VAC-101	Environmental Studies	VAC	2	0	2
	VAC- 2	GVM_BCA_VAC-105	Constitutional Values and Obligations	VAC	2	0	2
Total Credits							**20**

Semester	Subject Type	Paper Code	Paper Name	Subject Name	Lectures	Practical	Credits
II	Major - 2	GVM_BCA_CSC-100	Computer Organisation	Computer Application	3	1	4
	Minor - 2	GVM_BCA_MAT-112	Elementary Statistics	Mathematics	4	0	4
	Multidisciplinary - 2	GVM_BCA_COM-137	Tourism and Hospitality Management	Commerce	3	0	3
	AEC - 2	GVM_BCA_ENG-152	Digital Content Creation in English	English	2	0	2
	SEC - 2	GVM_BCA_CSA-143	Data Analytics using Spreadsheets	Computer Application	1	2	3
	VAC - 3	GVM_BCA_VAC-102	Environmental Studies -II	VAC	2	0	2
		GVM_BCA_VAC-112	E-Waste Management	VAC	2	0	2
	VAC - 4	GVM_BCA_VAC-115	Health and Wellness	VAC	2	0	2
		GVM_BCA_VAC-119	Health and Physical Education	VAC	2	0	2
Total Credits							**20**

Name of the Programme: Bachelor of Computer Applications
Course Code: CSA-100
Title of the Course: Problem Solving and Programming
Number of Credits: 4 (3T + 1P)
Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	1. To understand the concepts and techniques of problems solving. 2. To analyse, understand and build logic to solve basic problems. 3. To design Algorithms and flowcharts for better understanding and documentation for accurate implementation of the problem 4. To code and implement a well-structured, robust programming logic using a suitable programming language	
Units	**Content**	**No of hours 75 (45 T + 30 P)**
I.	**Introduction to Problem Solving** 1. Problem Solving Life Cycle – Understanding the Problem Statement, Analyzing the problem, Planning Program design using Hierarchy charts, Expressing Program logic using flowcharts / Pseudocode. 2. Structured Programming concept **3.** Modular Programming - Top-Down design, Bottom-up design, Stepwise Refinement	04
II	**Understanding basic problem Solving Tools** 1. Algorithms: Definition & its attributes, algorithm constructs, Statements: Input-Output, Decision-Making, &Looping, Examples 2. Flowchart: Definition & its attributes, symbols, Statements: Input-Output, Decision-Making & Looping, Module representation, Drawing conventions and standards, Examples. 3. Pseudo-code: Definition & its attributes, constructs, and Examples	06
III	**Basic Program Structures** Data & its types (Integer, Floating-point, Character, String), Constants & Variables, scope, Instructions & its types, how computer stores data, Operators (Arithmetic, Assignment, Relational, Logical, etc), Expressions and Equations, Evaluation of expressions, Keywords. Local and Global Variables, Parameters, Return Values, naming conventions & standards, Understanding literals, syntax and semantics, functions and modules.	06

IV	**Basic Sequential Instructions** Sequential statements using operators, constants, variables, operands, expressions and equations. *Activity: Design algorithms of at-least 3 basic problems to apply the concept learned in the unit. Represent it using flowchart and pseudo-code.*	06
V	**Problem Solving with Decisions** The Decision Logic Structure, Multiple If/Then/Else Instructions, Using Straight-Through Logic, Using Positive & Negative Logic, Logic Conversion, Decision Tables, Case Logic Structure *Activity: Design algorithms of at-least 3 basic problems to apply the concept learned in the unit. Represent it using flowchart.*	06
VI	**Problem Solving with Loops** The Loop Logic Structure, Incrementing, Accumulating, While/While End, Repeat/Until, Automatic-Counter Loop, Nested Loops, Indicators (flags). *Activity: Design algorithms of at-least 3 basic problems to apply the concept learned in the unit. Represent it using flowchart.*	06
VII	**Understanding functions** Functions: Definition and its need & constructs, designing simpler functions, function communication using arguments & return statements. scope of functions, function declaration and prototype, call by Value and Call by reference. Concept of Recursive functions: why, when and how. Designing recursive functions and recursive call. Base case and recursive case. *Activity: Design algorithms of at-least 3 basic problems to apply the concept learned in the unit. Represent it using flowchart.*	06
VIII	**Problem Solving with Arrays** Arrays Concepts: One dimensional Arrays, Creating, iterating, accessing and modifying array elements. Concept of Strings, String as array of characters. *Activity: Design algorithms of at-least 3 basic problems to apply the concept learned in the unit. Represent it using flowchart.*	03
IX	**Debugging & Documentation** Definition, Types, Need and how to do it.	02
Practical Work	Using any suitable programming language (eg C, C++, etc), the concepts learnt in the units from I to IX are required to	**Practical Hours (30)**

	implemented practically. The broad area of practical problems are mentioned / suggested below.	

Week 1 & 2
[These practicals should be done using pen & paper and using buddy learning strategy]
	1. For each of the following tasks, write a set of numbered, step-by-step instructions (a solution) so complete that another person could perform the task without asking questions. Define the knowledge base of this person by listing what you expect the person to know in order to follow your directions. For example, for task "a" (below), make a cup of cocoa, the knowledge base might include such things as knowledge of milk or water, a refrigerator, pan, spoon, cocoa, cup, range top or microwave, and so forth.
	    a. Make a cup of cocoa.
	    b. Sharpen a pencil.
	    c. Walk from the classroom to the student lounge, your dorm, or the cafeteria.
	    d. Start a car (include directions regarding what to do if the car doesn't start).
	    e. Get a glass of water from your kitchen.
	    f. Start your computer.
	2. Test your solution in problem 1 by giving your instructions to another person to see whether he or she can accomplish the task without your help. If they can't, modify your solution so that the person can accomplish the task. Check the solution again by giving the instructions to another person.
		04 Hours

Week 3 & 4	3. Basic Program Structures • At-least 10 basic programming problems related to Unit III to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**04 Hours**
Week 5 & 6	4. Basic Sequential Instructions • At-least 08 programming problems related to Unit IV to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**04 Hours**
Week 7 & 8	5. Problem Solving with Decisions • At-least 08 programming problems related to Unit V to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work	**04 Hours**

Week 9 & 10	6. Problem Solving with Loops • At-least 06 programming problems related to Unit VI to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**04 Hours**
Week 11 & 12	7. Understanding functions • At-least 08 programming problems related to Unit VII to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**04 Hours**
Week 13 & 14	8. Problem Solving with Arrays • At-least 06 programming problems related to Unit VIII to be completed during the practical sessions. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**04 Hours**
Week 15	9. Debugging & Documentation • Debug & Document at-least 06 problems which you have programmed from week 07 onwards. • More programs may be given to the learners to complete and practice as part of their Practice Work.	**02 Hours**

Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.**
	1. Lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use
	    a. Video/Animation to explain various concepts
	    b. Collaborative, Peer, Flipped Learning etc.
	2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking.
	3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it.
	4. Introduce Topics in manifold representations
	5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them
	6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding
	7. To promote self-learning give atleast one assignment (equivalent to 50% assignment weightage) where they can complete atleast one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations	

References/ Readings:	1. Maureen Sprankle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson Education India 9th edition (2013) 2. S.Kuppuswamy, S.Malliga, C.S.Kanimozhi Selvi, K.Kousalya. Problem Solving and Programming. 2019, Tata McGraw Hill. 3. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg ISBN:9788131500941, Cengage Learning India 4. Introduction to algorithms – Cormen, Leiserson, Rivest, Stein Ritchie,ISBN:9788120305960, PHI Learning 5. How to Solve it by Computer, R.G. Dromey, ISBN: 9788131705629, Pearson Education **Article in Online Encyclopedia** 1. https://code.world/ [Accessed: April 15, 2023]. 2. https://raptor.martincarlisle.com/ [Accessed: April 15, 2023].
Course Outcomes:	**On completion of the course, students will be able to –** 1. Understand the ways and stages of Problem Solving 2. Understand basic computing concepts, algorithm design, flowchart design, programming constructs and debugging. 3. Apply the problem solving & programming concepts in designing solution to simpler problems. 4. Code and implement a well-structured programming logic using a suitable programming language.

Name of the Programme: B.Sc. (Mathematics)
Course Code: MAT-111
Title of the Course: Elementary Mathematics
Number of Credits: 4 (3L+1T)
Effective from AY: 2023-24

Prerequisites	Basic 12th standard mathematics	
Course Objectives	To help students understand and acquire basic mathematical concepts and computational skills and apply these fundamental concepts in related disciplines.	
Content		Hours
Unit I	**Logic and Propositional Calculus:** Propositions and Compound Statements; Basic Logical Operations; Propositions and Truth Tables; Tautologies and Contradictions; Logical Equivalence; Algebra of Propositions; Conditional and Biconditional Statements.	05
	Sets: Sets and their representation; The empty set; Finite and Infinite Sets; Equal Sets; Subsets; Power Set; Universal Set; Union and Intersection of sets; Venn Diagrams; Operations on Sets; Complement of a set.	04
	Relations and Functions: Cartesian product of sets; Relation and their types; Functions and their types; Algebra of functions; Composition of functions; Invertible functions; Binary operations.	06
Unit II	**Limits:** Geometric meaning of limits; Standard limits.	02
	Continuity: Geometric meaning of continuity; Continuous functions; Algebra of continuous functions; Examples of continuous functions; Discontinuities; Types of discontinuities.	04
	Differentiability: First principle of differentiation; Algebra of differentiability namely sum/product/quotient rule; Examples; Result that every differentiable function is continuous; Derivative of the composition; Chain rule; (Statements of these results only. However, the idea of the proof, though not a part of the syllabus, is encouraged) Examples; Optimization problems.	04
Unit III	**Complex Numbers:** Algebra of complex numbers; Modulus and Complex conjugate; Argand plane and polar representation.	04
	Vector Algebra: Types of vectors; Addition of vectors; Multiplication of a vector by a scalar; Dot product and cross product of vectors, and their geometrical interpretation; Concept and computation of gradient, divergence, and curl of a vector field.	06
Unit IV	**Ordinary Differential Equations:** Types of differential equations; Order and Degree of a differential equation; Solution of a differential equation; Types of solutions; Formation of a differential equation by eliminating arbitrary constants; Methods of solving first _ order and first – degree differential equations.	10
Tutorial	**15 hours shall be utilized for solving the following:** 1. Constructing and understanding truth tables.	15

	2. Problems on set theory. 3. Identifying types of relations. 4. Identifying injective/surjective functions. 5. Computing the inverse of a bijective function. 6. Evaluating limits of functions. 7. Testing the continuity/discontinuity of a function and identifying the type of discontinuity. 8. Using the various differentiation rules to find the derivative of a given function. 9. Finding the maximum value of functions. 10. Finding the minimum value of functions. 11. Expressing complex numbers in polar form. 12. Solving problems involving gradient, divergence, and curl. 13. Forming a differential equation. 14. Solving ordinary differential equations – I. 15. Solving ordinary differential equations – II.	
Pedagogy	Lectures/Tutorials/Self-study. Lectures should include theoretical concepts and examples. Tutorial to be exclusively dedicated for problem solving. The record of tutorials may be maintained by students in a separate notebook.	
References/Readings	1) E. Mendelson: *Shaum's Outlines: Beginning Calculus*, 3rd Edition, McGraw Hill Education, 2007. 2) M. R. Spiegel, S. Lipschutz, J. J. Schiller, and D. Spellman: *Shaum's Outlines: Complex Variables*, 2nd Edition, McGraw Hill Education, 2017. 3) M. R. Spiegel, S. Lipschutz, and D. Spellman: *Shaum's Outlines: Vector Analysis*, 2nd Edition, McGraw Hill Education, 2017. 4) R. Bronson: *Shaum's Outlines: Differential Equations*, 3rd Edition, McGraw Hill Education, 2017. 5) S. Lipschutz, and M. L. Lipson: *Shaum's Outlines: Discrete Mathematics*, 3rd Edition, McGraw Hill Education, 2017.	
Course Outcome	The student will be able to, 1. Identify the truth and falsity of a statement. 2. Comprehend the concept of Sets, Relations, and Functions. 3. Evaluate basic limits, Identify discontinuous functions, and Apply the techniques of differentiation. 4. Construct the polar form of complex numbers. 5. Compute the gradient, curl, and divergence. 6. Formulate and Solve differential equations.	

Name of the Programme: Bachelor of Commerce (Honors)
Course Code: COM-133   Title of the Course: Marketing for Beginners
Number of Credits: 03
Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	Objectives of the Course are: 1. To develop an understanding of various concepts of marketing. 2. To acquaint learners with the knowledge of marketing mix and the skill to develop effective marketing strategy. 3. To acquaint learners with recent trends in marketing and to enable them to understand legal issues in marketing.	
Content:	**Unit 1: Introduction to Marketing** Marketing: Meaning, Nature, Scope of marketing, Need and Importance of Marketing. Selling v/s Marketing. Marketing Philosophies; Marketing Mix (7P's of marketing). Marketing Environment: Concept and importance of marketing environment, Micro and Macro environmental factors. Consumer behaviour: Need for studying consumer behaviour; Stages in Consumer buying decision process; Factors influencing consumer buying decisions.	**15 hours**
	Unit 2: Marketing Mix Decisions Product: Meaning and classification of product. Product life cycle and marketing mix. Branding: concept, functions and qualities of good brand name. Packaging and Labelling- concept and functions; Place; Pricing: Concept, Factors affecting price of a product, Pricing strategies; Promotion: Advertising, Personal selling, sales promotion, Public relation, direct marketing; Distribution channel: Meaning, types and strategies.	**15 hours**
	Unit 3: Recent Trends in Marketing Digital marketing: Meaning, types, Benefits. Traditional marketing v/s Digital marketing. Marketing for services: Meaning, scope and importance. Green marketing, social marketing, Rural marketing, Relationship marketing, Influencer marketing. Legal Issues in marketing- The Consumer Protection Act, 1986; Ethical issues in marketing, Consumerism and need for consumer protection.	**15 hours**
Pedagogy:	Lectures, Group discussions, Seminars, Case studies, Field work	
Reference/ Readings:	1. Kotler, Philip. (2003). Marketing Management. Prentice Hall 2. Kotler, P., Armstrong, G. and Agnihotri, P. (2018). Principles of Marketing (17th edition) Pearson Education. Indian edition. 3. Kotler, P., Keller, K.L. Koshy, A. & Jha. M. (2009). Marketing Management: A South Asian Perspective. (Thirteenth Ed). Pearson Education, New Delhi.	

	4. Maheshwari, R.P., Jindal, Lokesh, (2011). Marketing Management Theory and Practice.
	5. Gandhi, J.C. (1987). Marketing a Managerial Introduction. Tata McGraw Hill.
	6. Etzel, M. J., Walker, B. J., Stanton, W. J., & Pandit, A. (2010). Marketing (14th ed.). Mc Graw Hill.
	7. Patni, M. (2018). Digital Marketing (1st ed.). Literature house.
Course Outcomes:	After completion of this course, the learners will be able to: **CO 1:** Explain the concepts of marketing. **CO 2:** Develop the skills to analyze marketing mix. **CO 3:** Familiarize about the current trends in marketing **CO 4:** Discuss ethical and legal issues in marketing.

Name of the Programme: Bachelor of Arts- English
Course Code: ENG-151
Title of the Course: Communicative English: Spoken and Written
Number of Credits: 02
Effective from AY: 2023-24

Pre-requisites for the Course:	Interest in improving spoken and written English ski lls	
Course Objectives:	- To listen, understand and convey information - To listen and respond appropriately to the contributions of others - To understand others and present facts, ideas and opinions - To articulate experience and express what is thought, felt and imagined - To communicate clearly and fluently - To use grammatically correct language - To use a register appropriate to the audience and context	
Content:	**UNIT 1** - Verbal and non-verbal Skills: importance of pronunciation, enunciation, diction, articulation, intonation and body language. - Group Discussion: persuasion, negotiation, leading and participating. - Interview Skills: techniques of answering and conducting interviews. - Delivering Speeches: balancing rhetoric and empathy to connect with the audience. **UNIT 2** - Communication through Letters: cover letters, letters of goodwill, complaint letters and invitation letters. - Email Correspondence: components, format, attachments, content and language. - Writing Reports: format and steps. - Drafting Speeches: special occasion, motivational, informative, and extemporaneous.	(15 hours) (15 hours)
Pedagogy:	Topics to be taught using interactive teaching and the workshop method	
References/Rea dings:	- Beebe, S. A., & Beebe, S. J. *Public Speaking: An audience centered approach*. 8th ed, 2012 - Hancock, Mark. *English Pronunciation in Use*. Cambridge UP, 2003 onwards. - Krishna Mohan and N. P. Singh. *Speaking English Effectively* Macmillan India Ltd ISBN: 0333925521 - Lougheed, Lin. *Business Correspondence: A Guide to Everyday Writing*. Longman, 2003. - Murphy, Raymond. *Murphy's English Grammar*. Cambridge UP. - Vyas Manish A., Yogesh L. Patel. *Tasks for the English Classroom*. Macmillan, 2012. - Online Resource – The homepage of NATE (National Association of Teaching English) while a national British association, has many resources which are in effect international. Series: English Writing Frames – Copiable books. Could be used in used in conjunction with any language/Communication skills course. A systematic resource, with step–by-step practical exercises and photocopiable frames to practice with.	

Course Outcomes:	On completion of the course, the student will be able to do the following: - Elicit and show respect for the views of others as well as be culturally sensitive. - Display emotional stability and self-confidence. - Apply critical thinking skills through decision-making and problem-solving. - Demonstrate effective written communication for an intended purpose and audience that follows genre/disciplinary conventions that reflect creation, organization, precision, and revision.

Name of the Programme: Bachelor of Computer Applications
Course Code: CSA-142
Title of the Course: Python Programming
Number of Credits: 1T +2P
Effective from AY: 2023-24

Prerequisite for the Course :	Nil
Course Objectives :	1. To understand simple Python programs. 2. To develop Python programs with conditionals and loops. 3. To define Python functions. 4. To use Python data structures –- lists, tuples, dictionaries 5. To deal with input/ output files in Python. 6. To understand application areas of Python.

#	Title	Content	No of Hours (75)
		THEORY	15
I	Introduction to Python	• Data values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments	4
II	Program Flow Control	• Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays	4
III	List, Tuple and Dictionary	• Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension.	3
IV	Files, Modules, Packages	Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages	3

V	Application Areas	• Google Translate, Sentiment Analysis: Analyse Facebook data, Image processing, Page rank.	1
		PRACTICAL	60

1. Installation & IDE
2. Program to understand variables & different data types
3. Program to perform basic Input and Output operations
4. Program to demonstrate operations (Arithmetic, assignment, comparison)
5. Math, Strings, and Variables
6. Program to demonstrate Conditional Statements
7. Program to demonstrate setting precedence
8. Program to perform casting data types.
9. Program to demonstrate Control Structures
10. Repetition Structures- Program to demonstrate while loop and for loop
11. Program to demonstrate Break and Continue statements
12. Program to create custom Functions
13. Program to demonstrate local and global variables
14. Program to demonstrate arguments and return values
15. Program to perform list manipulation
16. Program to demonstrate Sets and its methods
17. Write a Tuple and perform sequence unpacking
18. Program to demonstrate key value pairs in dictionaries
19. Program to demonstrate recursive function
20. Program to perform File Input and Output
21. Program to demonstrate exception handling

Pedagogy:	**Suggested strategies to use to accelerate the attainment of the various course outcomes:**
	1. Lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use
	2. Video/Animation to explain various concepts.
	3. Collaborative, Peer, Flipped Learning etc.
	4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
	5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it.
	6. Introduce Topics in manifold representations.

	7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 9. To promote self-learning give atleast one assignment (equivalent to 50% assignment weightage) where they can complete atleast one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations. 10. One internal practical exam will be conducted as a part of internal evaluation. 11. Practical shall be performed in the laboratory as indicated in the syllabus. 12. A softcopy of e-journal shall be maintained clearly mentioning the name of the experiment and other required information.
References:	1. John V Guttag, Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013 2. Robert Sedgewick, Kevin Wayne, Robert Dondero, Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016, 1st Edition 3. Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015. 4. Kenneth A. Lambert, Fundamentals of Python: First Programs, CENGAGE Learning, 2012, New Edition 5. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/) 6. Guido van Rossum and Fred L. Drake Jr, An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
Course Outcomes:	At the end of the course, the students will be able to - 1. Describe the datatypes, various Control Structures used in Python. 2. Decompose a Python program into functions and recursive functions. 3. Represent compound data using Python lists, tuples, and dictionaries. 4. Understanding use of files and packages in Python Programs.

Name of the Programme: UG

Course Code: VAC-101   **Title of the Course:** Environmental Studies I

Number of Credits: 02

Effective from AY: 2023-24

Pre-requisites for the Course:	Same as programme	
Course Objectives:	Sensitise students to environmental conservation and sustainable use of resources	
Content:	Module 1 : Multidisciplinary nature of environmental studies Definition, scope and importance Need for public awareness. Natural Resources : Renewable and non-renewable resources : Natural resources and associated problems. Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. Land resources : Land as a resource, land degradation, man-induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.	No of hours 15
	Module 2 : Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem :- a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries); Biodiversity and its conservation Introduction – Definition : genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values,	15

	Biodiversity at global, National and local levels. Inida as a mega-diversity nation IV, Hot-sports of biodiversity. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.	
Pedagogy:	Class lectures, Case Studies, Field visits
References/ Readings:	1. Agarwal K.C. (2001): Environmental Biology, Bikaner, Nidi 2. Bharucha E.: The Biodiversity of India, Ahmedabad, Mapin 3. Bharucha E.: Textbook of Environmental Studies. Orient BlackSwan 4. Brunner R.C. (1989): Hazardous Waste Incineration, New York, McGraw-Hill 5. Chatwal G.R. & Sharma H. (2005: A Textbook of Environmental Studies, Mumbai, Himalaya 6. Clark R.S.: Marine Pollution, Oxford, Clanderson 7. Cunningham W.P., Cooper T.H., Gorani E. & Hepworth M.T. (2001): Environmental Encyclopaedia, Mumbai, Jaico. 8. De A.K.: Environmental Chemistry, Wiley 9. Desai R.J. (2003): Environmental Studies, Mumbai, Vipul, Goa University, Taleigao Plateau, Goa 10. Gleick H.P. (1993): Water in Crisis, Stockholm Envt. Institute, OUP 11. Hawkins R.E.: Encyclopedia of Indian Natural History, Mumbai, BNHS 12. Heywood V.H. & Watson R.T. (1995): Environment Protection and Laws, Mumbai, Himalaya 13. Jadhav H. & Bhosale V.M. (1995): Environment Protection and Laws, Mumbai, Himalaya 14. McKiney M.L. & Schoel R.M. (1996): Environment Science, Systems and Solutions, Web Enhanced Edition. 15. Mhaskar A.K.: Matter Hazardous, Techno-Science Publications 16. Miller T.G. Jr.: Environmental Science, Wadsworth 17. Odum E.P. (1971): Fundamentals of Ecology, Philadelphia, W.B. Saunders 18. Rao M.N. & Datta A.K. (1986): Waste Water Treatment, Oxford & IBH 19. Santra S.C. (2004): Environmental Science, Kolkata, Central Book Agency 20. Sharma B.K. (2001): Environmental Chemistry, Meerut, Goel Publishing House 21. Townsend C., Harper J. & Begon M.: Essentials of Ecology, Blackwell Science 22. Trivedi R.K.: Handbook of Environmental Laws, Rules, Guidelines, Compliances and, Standards, Vol.1 & 2, Enviro Media. 23. Trivedi R.K. & P.K. Goel: Introduction to Air Pollution, Techno-Science Publications

	24. Wagner K.D. (1998) Environmental Management, Philadelphia, W.B. Saunders Magazines
	Down to Earth, Centre for Science & Environment, Survey of the Environment published by The Hindu
	E- resource
	http://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf
Course Outcomes:	Students will have the ability to 1. Distinguish between renewable and non-renewable resources 2. Understand different ways to manage resources sustainability 3. Appreciate the value of bio-diversity and its management

Programme   : UG
Course Code   : VAC-105
Title of the Course : Constitutional Values and Obligations
Number of Credits   02
Effective from AY   : 2023-24

Pre-requisites for the Course:	No Pre-requisites	
Course Objectives:	To enable students to: 1. understand Constitutional Values. 2. be familiar with Fundamental Rights, Obligations of a State and Fundamental Duties	
Content:	**Unit 1: Evolution and structure of the Constitution** Constituent Assembly and the Constitution: Drafting of the Constitution, Tenets of Preamble including Secular, Socialist, Democratic, Republic, Republic State, Justice, Equality, Fraternity and Liberty. Main features of Indian Constitution: Basic Structure of Constitution. Rigidity and Flexibility, Federal structure, Rule of Law, Separation of Powers, Parliamentary Form of Government, Independent Judiciary and Citizenship,	15 hours
	Unit 2: Fundamental Rights, Directive Principles of State Policy and Fundamental Duties Fundamental Rights : Right to Equality, Freedom of Speech and Expression, Right to Life and Personal Liberty, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights and Right to Constitutional Remedies. Directive Principles of State Policy and its enforceability. Fundamental Duties: Moral Duty and Civic Duty ,Concept of Environmental Constitutionalism, PILs filed invoking Fundamental Duties and Judicial approach to Fundamental Duties.	15 hours
Pedagogy:	1 Lectures/Interactive Sessions/ Group Discussions/ Assignments 2 .Experiential Learning : .A. Identifying violations of Fundamental Rights in society by conducting interviews of affected parties. B. Reflections on violation of Fundamental Rights during Group discussion C. Conducting a survey on awareness about Fundamental Duties	
Reference/Readings:	Basu, D. D. (2019). *Introduction to Constitution.* Lexis Nexix. Kashyap, S. C. (2019). *Our Constitution : An Introduction to India's Constitution and Consitutional Law.* National Book Trust, India. Jain, M. P. (2022). *Indian Constitutional Law.* Lexis Nexis.	

	Shukla, V.N. (2023). *Constitution of India.* Eastern Book Company.
Course Outcome:	At the end of the course, the students will be able to: 1. Explain the relevance of Constitution of India in a democratic setup. 2. Describe the Fundamental Rights and Fundamental Duties. 3. Explain the policy of governance 4. Develop ability to apply the Values and State policy enshrined in the Constitution in national life.

Name of the Programme: Bachelor of Science in Computer Science (Honours)
Course Code: CSC-100
Title of the Course: Computer Organization
Number of Credits: 4 (3T+1P)
Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	1. Conceptualize the basics of Computer Organizational and Architectural issues and classify the computers based upon performance and machine instructions. 2. Learn various data transfer techniques and the I/O interfaces 3. Estimate and compare performances of various classes of memory 4. Understand the basics of ALU implementation, hardwired and microprogrammed control unit, pipelining and parallel architectures	
Theory:	1. Introduction to Logic Gates and Boolean Algebra: Logic Gates, Boolean Algebra, Combinational circuits, Karnaugh Map	4 hours
	2. Introduction to Computer Architecture: Introduction to Computer Architecture, Flynn's Classification of Computers, Performance Metrics (like Latency, throughput), Fundamental Blocks of Computer (like CPU, I/O subsystems, memory, control unit), computer function, interconnection structures, Bus interconnections	8 hours
	3. Instruction Set Architecture (ISA): Introduction to Instruction Set, Types of ISA; RISC, CISC; Processor Organization, Registers organization, Instruction Execution Cycle, Instruction formats, Addressing Modes; Register Transfer Language (RTL), Assembly Language Programming, X86 -Architecture, ARM Architecture	13 hours
	4. Memory Hierarchy: Hierarchical memory organization, Types of Memory-internal and external, Cache memory, Memory interleaving,	5 hours
	5. Data representation: Data Type Representation, Number System, Signed number, fixed, floating point, character representation, Addition, Subtraction, Multiplication - Shift and Add, Booth's Algorithm, Division	7 hours
	6. Peripheral devices: Types of Peripheral Devices, I/O subsystem,programmed I/O, Interrupt-driven I/O, DMA, I/O channels and processors	8 hours
Practical:	Sample Assignments for the Practical Component - 1. Introduction to 8086 architecture and instruction set and Writing assembly language programs in 8086 using MASM or compatible assembler either in windows or Linux 2. Find the sum of 1 + 2 + 3 .... + n	30 hours

	3. Display the multiplication table of a number	
	4. Store and retrieve numbers from memory	
	5. Sort the numbers stored in the memory	
	6. Installing Linux / Windows Operating System, Partitioning and formatting disk, Installing applications device drivers, working with files, mounting file systems, checking system space, creating, modifying and deleting user accounts	
	7. Study of Linux Commands	
	8. Shell Programming in Unix/Linux, arithmetic operations, loops, files Ex. Write a BASH shell script prime which will accept a number b and display first n prime numbers in standard output.	
	9. Shell scripting using general-purpose utilities. Ex. A) Write a menu driven shell script which will print the following menu and execute the given task to display result on standard output. a) Display calendar of current month b) Display today's date and time c) Display usernames those are currently logged in the system d) Display your name at given x, y position e) Display your terminal number f) Exit	
	10. Shell programming using filters (including grep, egrep, fgrep)	
Pedagogy:	PowerPoint, Tutorials, Hybrid learning	
References/ Readings:	1. Computer Architecture: A Quantitative Approach by John L. Hennessy & David A. Patterson, 5th Edition, Morgan Kaufmann 2. William Stallings, "Computer Organization and Architecture : Designing for performance", 9th Edition, Prentice Hall of India.	
Course Outcomes:	At the end of the course, students will be able to: 1. Explain the theory and architecture of central processing unit, I/O and memory organization 2. Analyze some of the design issues in terms of speed, technology, cost, performance, CPU architecture. 3. Describe the concepts of parallel processing, pipelining and interprocessor communication. 4. Represent different number systems, and perform various binary operations	

Name of the Programme: B.Sc. (Mathematics)
Course Code: MAT-112
Title of the Course: Elementary Statistics
Number of Credits: 4 (3L+1T)
Effective from AY: 2023-24

Prerequisites	NIL	
Course Objectives:	This course is intended to familiarize students with organizing, summarizing, analyzing data, and drawing appropriate conclusions from it. The various tools and techniques are also intended to be used in day-to-day real – world problems.	
Content		Hours
Unit I	**Introductory concepts**: Definition and scope of Statistics; Concept of population and sample. **Types of data**: Quantitative; Qualitative; Attributes; Variates. **Tabulation of data:** Class intervals; Frequency tables. **Presentation of data**: Diagrams and graphs: Bar diagrams and their types; Pie charts; Frequency polygon; Histogram; Ogives. Consistency and independence of data with special reference to attributes. **Scales of measurement:** Nominal, Ordinal, Interval, Ratio. **Measures of Central Tendency**: Mathematical and Positional – Mean, Median, Mode, Quartiles, Percentiles. **Measures of Dispersion**: Range, Quartile deviation, Standard deviation, Coefficient of variation.	15
Unit II	**Bivariate data**: Definition; Scatter diagram. **Correlation and Regression:** Simple, Partial and Multiple Correlation (3 variables only); Rank correlation; Simple linear regression.	10
Unit III	**Probability**: Introduction; Random experiments; Sample space; Events and algebra of events; Definitions of Probability – Classical, Statistical, and Axiomatic; Conditional Probability; Addition and Multiplication theorem of probability; Independent events; Theorem of Total probability; Bayes' theorem and its applications.	10
Unit IV	**Statistical Quality Control:** Introduction; Causes of variation in quality; Objective, advantages, and techniques of SQC. **Attribute data:** P chart, U chart, C chart. **Numerical data:** X bar chart, R bar chart, S bar chart. **Sampling techniques**: Various methods of data collection; Census survey and sample survey. **Sampling Methods:** Simple random sampling; Systematic sampling; Stratified sampling; Clustered sampling. **Non – probability Sampling Methods:** Convenience sampling; Consecutive sampling; Quota sampling; Purposive or Judgmental sampling; Snowball sampling.	10
Tutorial	**15 hours are to be dedicated for illustrations with specific examples and numerical exercises. The following topics are to be covered during practical:**	15

	1. Data entry in Excel and basic tools in Excel. 2. Drawing of Frequency tables for raw, grouped, and ungrouped data. 3. Graphical representations using various diagrams. 4. Finding Mean, Median, Mode. 5. Finding Quartiles and Percentiles. 6. Computing measures of dispersion, namely, Range, Quartile deviation, Standard deviation, and Coefficient of variation. 7. Computing and Analyzing the various types of correlation. 8. Finding the Rank correlation. 9. Analysing Multiple correlation. 10. Analysing Regression. 11. Solving problems on the addition and multiplication theorem of probability. 12. Solving problems on conditional probability and total probability. 13. Solving problems on Bayes' theorem. 14. Demonstration of quality control using P chart, U chart, C chart. 15. Demonstration of quality control using X bar chart, R bar chart, S bar chart.	
Pedagogy	Lectures/Tutorials/Self-study. Lectures should include theoretical concepts and examples. Tutorial to be exclusively dedicated for problem solving. In Unit I and II, more focus is to be kept on the applications of measures. The record of tutorials may be maintained by students in a separate notebook. Tutorial to be conducted using case studies/secondary data. The use of simple software like Excel during tutorial, wherever possible, is encouraged.	
References/Readings	**Principal Text** 1) S. C. Gupta: *Fundamentals of Statistics,* 7th Edition, Himalaya Publishing House, 2018. **Other Texts** 2) A. M. Goon, M. K. Gupta, and B. Dasgupta: *Fundamentals of Statistics, Vol. I*, 8th Edition, The World Press, Kolkata, 2016. 3) S. C. Gupta, and V. K. Kapoor: *Fundamentals of Mathematical Statistics*, 12th Edition, S. Chand and Sons, Delhi, 2020. 4) S. P. Gupta: *Statistical Methods,* S. Chand & Sons, 2017. 5) S. Bernstein, and R. Bernstein: *Schaum's Outlines: Elements of Statistics I – Descriptive Statistics and Probability*, McGraw Hill, 2020.	
Course Outcomes	The student will be able to, 1. Interpret data and graphically represent it. 2. Calculate measures of central tendencies and variations.	

| | 3. Analyze correlation and regression.
4. Solve problems in Probability theory.
5. Understand different data sampling techniques.
6. Apply statistical quality control. | |

Name of the Programme: Bachelor of Commerce (Honors)
Course Code: COM-137   Title of the Course: Tourism and Hospitality Management
Number of Credits: 03
Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	Objectives of the Course are: 1. To acquaint the learners with the fundamentals of tourism and challenges for sustainable tourism. 2. To enable learners to understand and describe various types of tourism and their constituents. 3. To enable learners to acquire skills in understanding the dynamics of hospitability.	
Content:	**Unit 1: Introduction to Tourism** Meaning and Definition of tourism and tourism-related terms - Tour, Tourist, Tourism Market, Tourism Resources, Tourism Product, Travel agent, Tour operator. Nature, Characteristics, and Importance of Tourism. Tourism Products, Features of Tourism Product, Type of Tourism Products, Difference between Tourism Products and other products, the 5 A's of Tourism Product: Attraction, Accessibility, Accommodation, Amenities and Affordability. Social evils of Tourism Industry – Responsible Vs Irresponsible Tourism – Sustainable Tourism.	**15 hours**
	Unit 2: Types and Forms of Tourism Types of tourism: Domestic, International; Inbound, Outbound, Inter-regional, Intra-regional. Forms: - Leisure, Business, Cultural, Religious, Sports, Medical, Adventure, Eco-Tourism, Green Tourism, Heritage Tourism, Sustainable Tourism, Cultural Tourism, Agri-Tourism and Rural Tourism. Factors affecting the growth of tourism, demand and supply factors for tourism, motivations in Tourism - Push and Pull factors Constituents of the tourism industry: Primary Constituents: Accommodation, Food, Transport, Intermediaries, Government Organizations; Secondary Constituents: Shops and Emporiums, Handicrafts and Souvenirs	**15 hours**
	Unit 3: Hospitality and its Related Sectors Origin, growth and nature of the Hospitality Industry, Factors affecting Hospitality and Tourism Industry, Employment Opportunities in the Hospitality Industry, Various sectors comprising the hospitality industry - lodging/accommodation, event planning, theme parks, transportation, cruises, Tourism and Hospitality in the 21st century – Global gaming and Casino operations – Recent trends, The future of travel and tourism around the world	**15 hours**
Pedagogy:	Lectures, Discussions, Presentations, Case Studies, Assignments, Class Activities	
Reference/ Readings:	1. Goeldner, C. R. &Brent Ritchie, J. R. (2011). Tourism: Principles, Practices, Philosophies, Wiley India, 2. Seth, P. N., & Bhat, S. S. (2010). An Introduction to Travel and Tourism, Sterling	

	Publishers Private Limited.
	3. Bhatia, K. (2010). An Introduction to Travel and Tourism, Sterling Publishers Private Limited.
	4. Bhatia, K. (2010). International Tourism, Sterling Publishers Private Limited.
	5. Cooper, C., Fletcher, J., Gilbert, D., & Wanhill, S. (2008). Tourism: Principles and Practice, Pitman Publishing.
	6. Davison, R. (2008). Tourism. Pitman Publishing.
	7. Smith, M., & Puczkó, L. (2015). Health and Wellness Tourism.
Course Outcomes:	After completion of this course, the learners will be able to: **CO 1:** Develop awareness about the concept of Tourism **CO 2:** Explain various forms of Tourism. **CO 3:** Identify the challenges for tourism development. **CO 4:** Identify the latest developments in Tourism and Hospitality industry.

Name of the Programme: Bachelor of Arts
Course Code: ENG-152
Title of the Course: Digital Content Creation in English
Number of Credits: 02
Effective from AY: 2023-24

Pre-requisites for the Course:	Knowledge of the digital medium coupled with an interest to create content for various online digital platforms	
Course Objectives:	• To introduce students to the process, genres and types of writing for digital platforms • To enhance multimedia literacy skills among students • To build confidence and ability in using digital technology for communication	
Content:	**Unit 1 –Digital Presentations** • Use of various software PowerPoint / Prezi (the Zooming Presentation Editor)/ Mind-Mapping Software • Learning the principles of slide designing - Slide: ology/Zen • Presentation skills (tone of voice, body language, eye-contact, etc.)	**(15 hours)**
	Unit 2 – Content creation Creating a blog **Digital Story Telling** • Elements of a story and preparation of a storyboard • Create/compose the digital story using appropriate software	**(15 hours)**
Pedagogy:	A combination of traditional writing skills and the use of technology to create, share and publish written content by introducing the students to a variety of digital tools, such as word processors, blogging platforms, and social media	
References/Readings:	• Frazel, Midge. *Digital Storytelling: Guide for Educators,* International Society for Technology in Education, 2010. • Hindle, Tim. *Making Presentations.* Dorling Kindersley Publishers, 1999. • Raina, Roshan Lal et al. *Professional Communication*. Himalaya Publishing House, 2012/ later editions • Reynolds, Garr. *Presentation Zen: Simple Ideas on Presentation Design and Delivery.* 2nd edition, Voices that Matter, 2011. • Zelazny, Gene. *Say it with Presentations*. Tata McGraw Hill Education, 2004.	
Course Outcomes:	On completion of the course, the student will be able to do the following: • Create and deliver individual presentations using a variety of digital software • Compose and present a digital story • Identify and distinguish between different genres of writing • Write a book/ film review • Interpret graphic data to arrive at an informed conclusion	

Name of the Programme: Bachelor of Computer Applications
Course Code: CSA-143
Title of the Course: Data Analytics using Spreadsheets
Number of Credits: 1T + 2P
Effective from AY: 2023-24

Pre-requisites fortheCourse:	Nil
Course Objectives:	● To be familiar and understand spreadsheet software. ● To be familiar and learn basic and advanced functions in any spreadsheet. ● To learn data analysis and data visualization with charts and pivot tables. ● To be familiar with power query in spreadsheets and learning joins. ● To understand data analysis tools and the functions used.

Sr. No.	Title	Content	No. of Hours
		THEORY	**15 hours**
I	Introduction to spreadsheets	Introduction to spreadsheets, understanding spreadsheet environment, cell addressing, cell references, absolute and relative cell references, named ranges, formatting using paste special, Data filters and sorting, worksheet and workbook protection	1
II	Formulas and Functions	Sum, Average, Min, Max, count, IF, nested IF, using IF with AND OR formulas, COUNTIF, SUMIF, AVERAGEIF formulas, TEXT functions	2
III	Advanced Functions	Vlookup function, match function, index function, date and time functions, maths functions, financial functions	2
IV	Data Analysis	Conditional formatting, What if analysis using data table, Goal seek, scenario manager, Linear regression	2
V	Charts and Visualization	Data storytelling tips, Introduction to charts, types of charts, uses and benefits, Understanding Pivot tables, Pivot table tips and tricks	2
VI	DAX and Power Query	Power query tips, Introduction to power pivot, Apply DAX in power pivot for analysis, introduction to types of joins in power query, full outer join and inner join in power query, left outer join and right outer join in power query, Left anti join and right anti join in power query	3

VII	Dashboard reporting in spreadsheets	Understanding how to create dashboard in spreadsheets, Sales Analytical Dashboard using Data Analysis Expressions (DAX) & Visualization, creating a simplified GANTT chart with AND function	2
VIII	Data Analysis tools	ANOVA, Correlation, Covariance, regression, sampling, t-test, z-test and histograms	1

PRACTICAL			60 hours
1		Practical on introduction to spreadsheet using simple tabular data and formatting using paste special, absolute and relative cell references, calculating sum, average, min, max, count and percentage.	4
2		Practical using IF, NESTED IF, SUMFIF, AVERAGEIF, COUNTIF	4
3		Practical on advanced functions	8
4		Practical on conditional formatting, what if analysis using Goal seek, scenario manager and linear regression	4
5		Practical on different types of charts and pivot table with suitable examples	8
6		Practical on Power query, DAX and different types of joins with suitable data.	12
7		Creating dashboard and gantt chart in spreadsheet using suitable examples	8
8		Excel data analysis Toolpak add-in covering ANOVA, Correlation, Covariance, Descriptive Statistical analysis, random number generation analysis, rank and percentile analysis, regression analysis, T-test, Z-test, Histogram	12

Pedagogy		**Suggested strategies to use to accelerate the attainment of thevarious course outcomes.**
		1. Lecture method need not be only a traditional lecture method, but alternativeeffective teaching methods could be adopted to attain the outcomes. You may use
		   a. Video/Animation to explain various concepts.
		   b. Collaborative, Peer, Flipped Learning etc.
		2. Ask at least three HOT (Higher-order Thinking) questions in the class, whichpromotes critical thinking.
		3. Adopt ProblemBased Learning (PBL), which fosters students' Analytical skills,develop design thinking skills such as the ability to design, evaluate, generalize,	

	andanalyse information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students tocome up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible,it helps improve the students' understanding 7. To promote self-learning give atleast one assignment (equivalent to 50% assignment weightage) where they can complete atleast one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations. 8. One assignment in the form of mini-project collecting data and using analytic tools may be given to the students.	
References/Readings	i) Kenneth N Berk, Data Analysis with Microsoft Excel ii) Microsoft Excel 2019 Data Analysis And Business Modeling, Sixth Edition, Microsoft.	
Course Outcomes	**On completion of the course learners will be able to:-** 1. Understand the basics of spreadsheets and advanced functions 2. Apply data analysis and data visualization using charts and pivot tables. 3. Apply the knowledge of power query and DAX in spreadsheets. 4. Apply data analysis tools and solve simple real life data analysis applications.	

Name of the Programme: BA Economics

Course Code: VAC-102   **Title of the Course:** Environmental Studies II

Number of Credits: 02 (Hours 20L-0T-20P)

Effective from AY: 2023-24

Pre-requisites for the Course:	Same as programme	
Course Objectives:	Sensitise students to environmental conservation	
Content:	**Module 1** : Environmental Pollution Definition • Cause, effects and control measures of :- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management : Causes, effects and control measures of urban and industrial wastes. • Role of an individual in the prevention of pollution. • Pollution case studies. • Disaster management : floods, earthquakes, cyclone and landslides. Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation, rainwater harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and the holocaust. Case Studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in the enforcement of environmental legislation. • Public awareness.	No of hours 10L
	Module 2: Human Population and the Environment • Population growth, variation among nations. • Population explosion – Family Welfare Programme. Environment and human health. • Human Rights. • Value Education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in Environment and human health. • Case Studies.	10L

	Field work Visit a local area to document environmental assets river/forest/grassland/hill/mountain • Visit a local polluted site-Urban/Rural/Industrial/Agricultural • Study common plants, insects, and birds. Study of simple ecosystems-pond, river, hill slopes, etc.	20P
Pedagogy:	Class lectures, Case Studies, Field visits	
References/ Readings:	1. Agarwal K.C. (2001): Environmental Biology, Bikaner, Nidi 2. Bharucha E.: The Biodiversity of India, Ahmedabad, Mapin 3. Bharucha E.: Textbook of Environmental Studies. Orient BlackSwan 4. Brunner R.C. (1989): Hazardous Waste Incineration, New York, McGraw-Hill 5. Chatwal G.R. & Sharma H. (2005: A Textbook of Environmental Studies, Mumbai, Himalaya 6. Clark R.S.: Marine Pollution, Oxford, Clanderson 7. Cunningham W.P., Cooper T.H., Gorani E. & Hepworth M.T. (2001): Environmental Encyclopaedia, Mumbai, Jaico. 8. De A.K.: Environmental Chemistry, Wiley 9. Desai R.J. (2003): Environmental Studies, Mumbai, Vipul, Goa University, Taleigao Plateau, Goa 10. Gleick H.P. (1993): Water in Crisis, Stockholm Envt. Institute, OUP 11. Hawkins R.E.: Encyclopaedia of Indian Natural History, Mumbai, BNHS 12. Heywood V.H. & Watson R.T. (1995): Environment Protection and Laws, Mumbai, Himalaya 13. Jadhav H. & Bhosale V.M. (1995): Environment Protection and Laws, Mumbai, Himalaya 14. McKiney M.L. & Schoel R.M. (1996): Environment Science, Systems and Solutions, Web Enhanced Edition. 15. Mhaskar A.K.: Matter Hazardous, Techno-Science Publications 16. Miller T.G. Jr.: Environmental Science, Wadsworth 17. Odum E.P. (1971): Fundamentals of Ecology, Philadelphia, W.B. Saunders 18. Rao M.N. & Datta A.K. (1986): Waste Water Treatment, Oxford & IBH 19. Santra S.C. (2004): Environmental Science, Kolkata, Central Book Agency 20. Sharma B.K. (2001): Environmental Chemistry, Meerut, Goel Publishing House 21. Townsend C., Harper J. & Begon M.: Essentials of Ecology, Blackwell Science 22. Trivedi R.K.: Handbook of Environmental Laws, Rules, Guidelines, Compliances and, Standards, Vol.1 & 2, Enviro Media.	

	23. Trivedi R.K. & P.K. Goel: Introduction to Air Pollution, Techno-Science Publications 24. Wagner K.D. (1998) Environmental Management, Philadelphia, W.B. Saunders Magazines Down to Earth, Centre for Science & Environment, Survey of the Environment published by The Hindu E- resource http://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf
Course Outcomes:	Students will be able to: 1. Understand the impact of pollution on human welfare 2. Appreciate ethical issues of environmental rights and duties 3. Undertake preliminary field analysis of environmental damage

Name of the Programme: UG
Course Code: VAC-112
Title of the Course: E-Waste Management
Number of Credits: 02
Total Hours: 30
Effective from AY: 2023-24

Pre-requisites for the Course	Same as Programme prerequisite	
Course Objectives:	This course is intended to: • Introduce to students with the scenario of E-waste. • Understand key terms associated with E- waste. • To impart life skills about E waste management in routine daily life to minimize the hazards. Create awareness of the regulations related to E-waste to contribute in effective management throughout the society	
Content:	**Unit 1: Introduction to E-waste** Introduction. E- waste; composition and generation. Global context in e- waste; Growth of Electrical and Electronics industry in India, E-waste generation in India, E-waste pollutants, E waste hazardous properties, Effects of pollutant (E- waste) on human health and surrounding environment, domestic e-waste disposal. Essential factors in global waste trade economy, Waste trading as a quint essential part of electronic recycling, Free trade agreements as a means of waste trading. Import of hazardous e-waste in India; India's stand on liberalizing import rules, E-waste economy in the organized and unorganized sector. Estimation and recycling of e-waste in metro cities of India. E-waste control measures:Need for stringent health safeguards and environmental protection laws in India, Extended Producers Responsibility (EPR), Import of e-waste permissions, Producer-Public-Government cooperation, Administrative Controls & Engineering controls, monitoring of compliance of Rules, Effective regulatory mechanism strengthened by manpower and technical expertise, Reduction of waste at source.	15 hours

	Unit 2: E-waste Management	15 hours
	Basic principles of E waste management, Component of E waste management, Technologies for recovery of resources from electronic waste: Recycling and recovery technologies – resource recovery potential of e-waste, steps in recycling and recovery of materials-mechanical processing, technologies for recovery of materials, occupational and environmental health perspectives of recycling e-waste in India.	
Pedagogy:	Lectures/Experiential Learning	
References/Readings	1. Johri R., E-waste: implications, regulations, and management in India and current global best practices, TERI Press, New Delhi ,2008 2. Fowler B, Electronic Waste, Elsevier, 2017 3. Bhagat-Ganguly, VarshaE-Waste Management: Challenges and Opportunities in India,Routledge, New Delhi, 2021 4. Nautiyal, Navtika Singh and ShuchitaAgarwal (ed) Future of e-Waste Management: Challenges and Opportunities, Thomson Reuters, 2021. ISBN 13: 978-9390529858	
Course Outcomes	Students will, be able to • Understand the environmental impacts of e-waste. • Describe the process recycling of e-waste. • Distinguish the role of various national and internal act and laws applicable for e-waste management and handling. • Analyse the e – waste management measures proposed under national and global legislations.	

Name of the Programme: UG
Course Code: VAC–115
Title of the Course: Health and Wellness
Number of Credits: 02
Total Hours: 30
Effective from AY: 2023-24

Pre-requisites for the Course:	Same as programme	
Course Objectives:	• To introduce the student to the models and dimensions of health and wellness. • To familiarize students with lifestyle diseases and the need for lifestyle changes. • To understand the nature of mental health and stress and its management. • To enable students to manage their health and wellness via healthy eating, physical fitness and rational decision making.	
Content:	**Unit 1: Introduction to Health and Wellness** • Meaning: Models of Health - Medical and Wellness; Dimensions of Health and Wellness; Measuring Health. • Lifestyle diseases; Making Lifestyle Changes: Health Belief Model, Trans-theoretical Model, Theory of Reasoned Action. • Mental Health and Stress: Thoughts, Emotions, and Mental Health; Stress: Components and Management. **Unit 2: Health and Wellness Management** • Healthy Eating: Components of Food; Dietary Guidelines for Eating Right; Sensible Weight Management. • Physical Activity for Health: Components and Benefits. • Making Decisions about Health Care: Being a wise Healthcare Consumer; Choosing a Healthcare Provider; Health Insurance.	No. of hours (15 hours) (15 hours)
Pedagogy:	Lectures/Case analysis/Assignments/Classroom interactions	
References/ Readings:	**Main Textbook** • G. Edlin and E. Golanty, Health & Wellness, 13th ed. United States of America: Jones & Bartlett Learning, 2019. • Suggested References • S. Anil, Ed., Healthful Eating As Lifestyle (HEAL): Integrative Prevention for Non-Communicable Diseases. Boca Raton: CRC Press Taylor & Francis Group, 2017. • A. E. Hardman and D. J. Stensel, D. J., Physical Activity and Health: The Evidence Explained, 2nd ed. London and New York: Routledge, Taylor & Francis Group, 2009. • K. L. Harkness and E. P. Hayden, Eds., The Oxford Handbook of Stress and Mental Health. New York: Oxford University Press, 2020. • Human Kinetics, Health and Wellness for Life. Health Textbooks. United States of America: Human Kinetics, Inc., 2010. • D. C. Wood, The Economics of Health and Wellness: Anthropological Perspectives, Research in Economic Anthropology, Vol. 26. United Kingdom: Elsevier Ltd., 2008.	

Course Outcomes:	Upon completion of this course, the student will be able to: 1. Comprehend the models and dimensions of Health and Wellness. 2. Understand the prevalence of Lifestyle diseases and the urgency for change. 3. Analyze the nature of Mental Health and Stress and ways to manage the same. 4. Elucidate on Management of Health and Wellness through mechanisms of Nutrition, Fitness and Rational decisions.

Name of the Programme: UG
Course Code: VAC-119   **Title of the Course:** Health and Physical Education
Number of Credits: 2
Effective from AY: 2023-24

Pre-requisites for the Course:	None	
Course Objectives:	• Develop an understanding of the relationship among physical activity, fitness, and health and the physiological and psychological benefits of physical activity. • Impart knowledge of theoretical foundations of motor development and learning, cognitive and affective dimensions of physical activity, and physical activity interventions for mental health conditions. • Make students understand the components of physical fitness, how to measure them, and develop skills in the prescription of physical activity for different populations while also considering safety. • Acquire practical skills in a range of exercises including cardiovascular, resistance, core strengthening, flexibility, circuit training, low-intensity interval training, sports and recreational activities, yoga, and Pilates. • Develop knowledge of basic nutrition and hydration practices, stress management techniques, injury prevention, and fitness assessment and goal setting. • Learn to create personalized fitness plans and understand how to review and adjust them to meet individual goals. • Enhance critical thinking and decision-making abilities in selecting appropriate physical activity for individual needs, preferences, and abilities.	
Content:	**Chapter 1: Introduction to Health and Physical Education** • Defining health and physical education (1 hour) • The relationship between physical activity, fitness, and health (1 hour) • The physiological and psychological benefits of physical activity (2 hours) • The relationship between physical activity and chronic diseases (2 hours)	6 Hours
	Chapter 2: Theoretical Foundations of Health and Physical Education (6.5 Hours) • Understanding the principles of motor development and learning (1 hour) • Cognitive and affective dimensions of physical activity (1.5 hour) • Physical activity interventions for mental health conditions (2 hours) • The role of physical activity in promoting mental health (2 hours)	6.5 Hours
	Chapter 3: Physical Activity Guidelines and Prescription (10 Hours) • The components of physical fitness and how to measure them (2 hours) • The development of physical activity guidelines and their impact	10 Hours

(2 hours)
• Prescription of physical activity for different populations (5 hours)
• Safety considerations in physical activity (1 hours)
Chapter IV Practical Component (15 Hours):

M No:	Module	Activities	Hours	
1	Warm-up exercises and stretching	Basic warm-up exercises and stretching	1	Practical Component 15 Hours
2	Cardiovascular exercises	Jogging, running, cycling, etc.	1	
3	Resistance training	Weightlifting, bodyweight exercises	1	
4	Core strengthening exercises	Planks, crunches, leg lifts	1	
5	Flexibility exercises	Static stretching (Active and Passive)	1	
6	Circuit training	Circuit-based exercises	1	
7	Low-intensity interval training (LIIT)	LIIT-based exercises	1	
8	Sports and recreational activities	Indigenous sports	1	
9	Yoga and Pranayama	Hath Yoga and Basic Techniques of Pranayama & Meditation	1	
10	Nutrition and hydration	Basic nutrition guidelines and hydration practices	1	
11	Mental health and stress management	Basic stress management techniques	1	
12	Injury prevention and first aid	Basic injury prevention techniques	1	
13	Fitness assessment and goal setting	Basic fitness assessment techniques and goal setting	1	
14	Personalized fitness plans	Creation of personalized fitness plans	2	

Pedagogy:	• Lecture-based teaching • Active learning • Experiential learning • Collaborative learning • Personalized learning • Self-directed learning • Flipped classroom • Project-based learning
References/ Readings:	**Single Author Book** Bean, A. (2008). The Complete Guide to Strength Training (Complete Guides). Bloomsbury Sport. Bompa, T. O. (2018). Periodization: Theory and Methodology of Training. Human Kinetics. Bompa, T. O. (2019). Periodization-6th Edition: Theory and Methodology of Training. Human Kinetics. Delavier, F. (2010). Strength Training Anatomy. Human Kinetics. Foran, B. (2001). High-Performance Sports Conditioning. Human Kinetics. Karpinski, C., & Rosenbloom, C. (2017). Sports Nutrition: A Handbook for Professionals. Academy of Nutrition and Dietetics. Shirl J. Hoffman. (2018) Introduction to Kinesiology: Studying Physical Activity" **Three or More Authors** A.K. Uppal, V.L.G Kumar, M.M Panda. Biomechanical in physical education and exercise science. A.K. Uppal, V.L.G Kumar, M.M Panda. Kinesiology in physical education and exercise science. Mack, G., & Casstevens, D. (2002). Mind Gym: An Athlete's Guide to Inner Excellence. McGraw Hill Professional. **E-books** "Essentials of Strength Training and Conditioning" by National Strength and Conditioning Association "Health and Physical Education: A Practical Approach for Primary Schools" by Sue Chedzoy. National Strength and Conditioning Association. (2011). NSCA's Essentials of Personal Training. Human Kinetics.
Course Outcomes:	After studying this course, the students will be able to: 1. know the difference and relationship among physical activity, fitness, and health and describe the physiological and psychological benefits of physical activity; 2. analyze the theoretical foundations of motor development and learning, cognitive and affective dimensions of physical activity, and physical activity interventions for mental health conditions; 3. evaluate the components of physical fitness, how to measure them, and

	develop skills in the prescription of physical activity for different populations while also considering safety;
	4. demonstrate practical skills in a range of exercises including cardiovascular, resistance, core strengthening, flexibility, circuit training, low-intensity interval training, sports and recreational activities, yoga, and Pilates; a
	5. apply knowledge of basic nutrition and hydration practices, stress management techniques, injury prevention, and fitness assessment and goal setting to promote health and wellness; and
	6. develop personalized fitness plans and evaluate and adjust them to meet individual goals.