



Rayat Shikshan Sanstha's

**Yashwantrao Chavan Institute of Science, Satara
(Autonomous)**

Lead College, Karmaveer Bhaurao Patil University

Reaccredited by NAAC (3rd Cycle) with 'A+' grade (CGPA 3.57).

ISO 9001:2015 Certified

Bachelor of Science

Part - I

Artificial Intelligence (Entire)

Syllabus

To be implemented

w.e. f. June, 2023

NEP 2020

Rayat Shikshan Sanstha's
Yashavantrao Chavan Institute of Science, Satara (Autonomous)
Department of Artificial Intelligence (Entire)
Syllabus for Bachelor of Science Part-I

1. TITLE: ARTIFICIAL INTELLIGENCE (ENTIRE)

2. YEAR OF IMPLEMENTATION: New Syllabi for the B.Sc. I Artificial Intelligence (Entire) will be implemented from June 2023 onwards.

3. PREAMBLE:

Bachelor of Science is an integrated academic degree in the faculty of science. The revision of existing syllabus of Artificial Intelligence subject in Science Faculty is essential. This is a humble endeavor to initiate the process towards an era of knowledge. Intelligent machines have replaced human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the branch of computer science that emphasizes on creating intelligent machines that work and reacts like humans. This course is designed to span a wide variety of topics in computer science research, including machine learning, Game playing, Expert Systems etc.

4. GENERAL OBJECTIVES OF THE COURSE:

- 1) To undertake industry careers involving innovation and problem-solving using software and other information technologies.
- 2) To undertake research careers in Computer Sciences and allied areas.
- 3) To contribute to society by becoming a model professional who can communicate effectively and observes ethical behaviour
- 4) To inculcate the software development attitude and generate interest in the field of Technology.
- 5) To develop programming skills, management skills, writing skills, Project Analysis skill among students.

5. PROGRAM SPECIFIC OUTCOMES (PSO's):

- 1) Ability to contribute to problem identification, analysis, design, and development of systems using principles and concepts of Artificial Intelligence and Machine Learning.
- 2) Apply the concepts and practical knowledge in analysis, design and development of computing systems and applications to multi-disciplinary problems.
- 3) To provide a concrete foundation and enrich their abilities to qualify for Employment, Higher studies and Research in Artificial Intelligence and Data science with ethical values.
- 4) Ability to use Artificial Intelligence and Machine Learning models on data for enabling better decision making.

6. DURATION:

- The course shall be a full-time course.

7. PATTERN: Semester

8. MEDIUM OF INSTRUCTION: ENGLISH

Major Syllabus

Course Structure for B.Sc. I (Semester- I)

Theory				Practical				
Course Title	Course Code	Lecture per week	Credits	Course	Course Title	Course Code	Lecture per week	Credits
Introduction to Artificial Intelligence	BAIT-111	5	2	Practical	Major Practical -I	BAIP - 113	4	2
Programming in C	BAIT - 112		2					

Structure and Title of Courses of B. Sc. Course:

* B. Sc. I Semester I *

Course Number	Course Code	Course Name
I	BAIT- 111	Introduction to Artificial Intelligence
II	BAIT - 112	Programming in C
Lab -1	BAIP - 113	Major Practical-I

Minor Syllabus

Course Structure for B.Sc. I (Semester- I)

Theory				Practical				
Course Title	Course Code	Lecture per week	Credits	Course	Course Title	Course Code	Lecture per week	Credits
Fundamentals of Computers	BAIT-114	5	2	Practical -1	Fundamentals of Computers and Computational Statistics-I	BAIP - 116	4	2
Computational Statistics-I	BAIT - 115		2		Lab-I			

Structure and Title of Courses of B. Sc. Course:

* B. Sc. I Semester I *

Course Number	Course Code	Course Name
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I	BAIT- 114	Fundamentals of Computers
II	BAIT- 115	Computational Statistics-I
Practical -1	BAIP- 116	Fundamentals of Computers and Computational Statistics -I Lab-I

Open Elective

Open Elective (OE) Course Name: Museum Studies Course

Structure

Semester	Course Title	Credits		List of Practical
		T	P	
Sem-I	1) Introduction to Museum	2	2	15
	2) Study and Importance of the Museum	2		
Sem-II	3) Museum Management	2	2	15
	4) Preventive Conservation of Museum	2		

Major Syllabus

B.Sc. I- Semester-I

Theory: Course- I: BAIT111: Introduction to Artificial Intelligence

Course Objectives: Students should be able to...

1. Understand a historical perspective of AI and its foundations.
- 2.
3. identify to design and program Python applications.
4. learn to use lists, tuples, and dictionaries in Python programs.
4. Study basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.

Credits=2	SEMESTER-I	No. of hours per unit/credits
	Course- I: BAIT111: Introduction to Artificial Intelligence	
Unit I	Introduction and Problem-Solving Methods	(8)
	Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents–Typical Intelligent Agents – Problem Solving Approach to Typical AI problems. Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning	
Unit II	Knowledge Representation	(8)
	Architecture for Intelligent Agents, First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories -Reasoning with Default Information	
Unit III	Basics of Python Programming	(8)
	Introduction to Python - Python Interpreter - Data types - Identifiers and keywords - Integral Types - Floating Point Types – Strings. Case Sensitive - Scripts - Sequence Types - Tuples - Named Tuples - Sets - Mapping Types - Dictionaries-Generators – Iterators.	
Unit IV	Programming Paradigms in Python	(6)
	Array definition and declaration, initialization of arrays, types of arrays, String handling functions, Arrays and functions.	

Course Outcomes: Students will be able to...

2. evaluate basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3. apply the structure and components of a Python program.
4. analyse to write loops and decision statements in Python.
1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

Reference Books:

1. Stuart Russell, peter Norvig (2020), Artificial Intelligence: A Modern Approach, 4th Edition, University of California at Berkeley, Pearson education.
2. Miguel Grinberg(2018), “Flask Web Development: Developing Web Applications with Python”, 2nd Edition, O'Reilly Media. ISBN-13: 978-1491991732
3. Wesley J Chun, (2015),“Core Python Applications Programming”, 3rd Edition, Pearson Education India. ISBN-13: 978-9332555365
4. Gerhard Weiss, (2013), Multi Agent Systems, Second Edition, MIT Press.
5. S. Russell and P. Norvig,(2009) "Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition.
6. M. Tim Jones,(2008),Artificial Intelligence: A Systems Approach (Computer Science),Jones and Bartlett Publishers, Inc.; First Edition

B.Sc. I- Semester-I

Theory: Course II: BAIT112: Programming in C

Course Objectives: Students should be able to...

1. understand working of hardware and software and the importance of operating systems
2. identify programming languages, number systems, peripheral devices, networking, multimedia and internet concepts
3. Study of the syntax and semantics of the C programming language.
4. Learn the usage of structured programming approaches in solving problems.

Credits=2	SEMESTER-I Course II: BAIT112: Programming in C	No. of hours per unit/ credits
Unit I:	Introduction to C Programming Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C, Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants, Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display Single character and a string - getchar, putchar, gets and puts functions.	(8)
Unit II:	Operators and Control Structures Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associativity; Evaluation of arithmetic expressions; Type conversion, Decision making Statements - Simple if, if else, nested if else, else if ladder, Switch Case, goto, break & continue statements; Looping, Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops	(8)
Unit III:	Arrays and functions Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation. Need for user applied functions; Format of C user applied functions; Components of user applied functions - return type, name, parameter list, function body, return statement and function call; Categories of user applied functions - With and without parameters and return type, Strings: Declaring & Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat; Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc.	(8)

Unit IV:	Pointers in C	(6)
	Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers	

Course Outcomes: - Students will be able to...

1. perform input and output operations using programs in C
2. create and Write programs that perform operations on arrays
3. analyse, read, understand and trace the execution of programs written in C language
4. Decompose a problem into functions and to develop modular reusable code.

Reference Books:

1. P. K. Sinha & Priti Sinha(2022), [Foundations of Computing](#)(BPB)
2. Yashwant Kanetkar(2021), Let Us C : Authentic guide to C programming language (18th Edition)
3. V. Rajaraman(2019), Programming in C (PHI – EEE), 2nd edition,PHI Learning Private Limited.
4. S. Byron Gottfried (2018) Programming with C (TMH), 4th edition.
5. E. Balaguruswamy(2017), Programming in ANSI C (TMH),7th Edition McGraw-Hill
6. Kamthane(2008), Programming with ANSI and TURBO C ,3rd edition,(Pearson Education)

Practical-I

Lab Course I: BAIP113: Major Practical-I

Course Objectives: Students should be able to...

1. Study of awareness of fundamental understanding of various applications of AI techniques
2. identify programming skills in core Python.
3. learn an IDE to create, edit, compile, run and debug programs
4. understand the various steps in program development.

Credits=2	SEMESTER-I Lab Course I- Major Practical-I	No. of hours per unit/ credits(60)
Part A :	Introduction to Artificial Intelligence	
	<ol style="list-style-type: none">1. Study of basics of Artificial Intelligence and its algorithms.2. Write a program to demonstrate different number data types in Python.3. Write a program to perform different Arithmetic Operations on numbers in Python.4. Write a program to create, concatenate and print a string and accessing sub-string from a given string.5. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”6. Write a program to create, append, and remove lists in python.7. Write a program to demonstrate working with tuples in python.8. Write a program to demonstrate working with dictionaries in python.9. Write a python program to find largest of three numbers.10. Write a Python program to construct the following pattern, using a nested for loop <pre>* *</pre>	
Part B :	Programming in C	

	<ol style="list-style-type: none">11. Program to read radius of a circle and to find area and circumference.12. Program to read three numbers and find the biggest of three13. Program to read a number, find the sum of the digits, reverse the number and check it for palindrome14. Program to read percentage of marks and to display appropriate message (Demonstration of else-if ladder)15. Program to find the roots of quadratic equation (demonstration of switch Case statement)16. Program to read marks scored by n students and find the average of marks (Demonstration of single dimensional array)17. Program to demonstrate string functions.	
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	<p>18. Program to demonstrate pointers in C</p> <p>19. Program to demonstrate student structure to read & display records of n students.</p> <p>20. Program to demonstrate the difference between structure & union.</p>	
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Course Outcomes: - Students will be able to...

1. elaborate problems where artificial intelligence techniques are applicable
2. use of the python programming language to construct basic programs
3. translate given algorithms to a working and correct program and correct syntax errors as reported by the compilers
4. demonstrate and correct logical errors encountered during execution and represent and manipulate data with arrays, strings and structures

Reference Books:

1. P. K. Sinha & Priti Sinha(2022), [Foundations of Computing](#)(BPB)
2. Yashwant Kanetkar(2021), Let Us C : Authentic guide to C programming language (18th Edition)
3. Stuart Russell, peter Norvig (2020),Artificial Intelligence: A Modern Approach, 4th Edition, University of California at Berkeley, Pearson education.
4. V. Rajaraman(2019), Programming in C (PHI – EEE), 2nd edition,PHI Learning Private Limited.
5. Miguel Grinberg(2018), “Flask Web Development: Developing Web Applications with Python”, 2nd Edition, O'Reilly Media. ISBN-13: 978-1491991732
6. Wesley J Chun, (2015),“Core Python Applications Programming”, 3rd Edition, Pearson Education India. ISBN-13: 978-9332555365
7. Gerhard Weiss, (2013),Multi Agent Systems, Second Edition, MIT Press.

Minor Syllabus
B.Sc. I- Semester-I

Theory: Course I-BAIT114: Fundamentals of Computers

Course Objectives: - Students should be able to...

1. study the basics of computer.
2. learn algorithm, Flowchart and Pseudo code with Examples.
3. understand the fundamentals of operating systems.
4. identify WebBasics and internet features.

Credits=2	SEMESTER-I Course I-BAIT114: Fundamentals of Computers	No. of hours per unit/ credits
UNIT I	Fundamentals of Computer	(8)
	Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organisation of a Digital Computer; Number Systems– different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs– Assembler, Interpreter and Compiler; Planning a Computer Program- Algorithm, Flowchart and Pseudo code with Examples	
UNIT II	Introduction to computers	(8)
	Input and Output Devices: Keyboard, mouse, touch screen, joystick, scanner, web camera, MICR, OCR, OMR, bar-code reader, monitor, printer, plotter. Memory: Primary, secondary, auxiliary memory; RAM, ROM, cache memory, magnetic tape, magnetic disks, hard disk drives, optical disks, CD-R, DVD, flash drives, blue ray disc, Computer Organization and Architecture: C.P.U., registers, system bus, main memory unit, LOCF - Page: 1 of 35 processors., motherboard, ports and interfaces, expansion cards, ribbon cables, SMPS, memory chips.	
UNIT III	Operating System Fundamentals	(6)
	Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems, System programs, Application programs, Utilities, The Unix Operating System, Basic Unix commands, Microkernel Based Operating System, Booting	
UNIT IV	Internet Basics	(8)

Introduction, Features of Internet, Internet application, Services of Internet, Logical and physical addresses, Internet Service Providers, Domain Name System. Web Basics: Introduction to web, web browsers, http/https, URL, HTML5, CSS	
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Course Outcomes: - Students will be able to...

1. apply Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching
2. analyse introduction of computers, classification of computers, anatomy of computer.
3. evaluate the constituents and architecture of computers and microcontrollers.
4. explain Web Programming basics, introduction of HTML and CSS programming

Reference Books:

1. J. Glenn Brook shear,(2015),” Computer Science: An Overview”, Addison-Wesley, Twelfth Edition
2. David Riley and Kenny Hunt(2014), Computational thinking for modern solver, Chapman & Hall/CRC
3. Pradeep K. Sinha and Priti Sinha(2010), Computer Fundamentals (Sixth Edition), BPB Publication
4. R.G. Dromey,(2005), “How to solve it by Computer”, PHI.

B.Sc.I- Semester-I

Theory: Course II-BAIT115: Computational Statistics-I

Course Objectives: Students should be able to...

1. learn to impart adequate knowledge on the need of statistics.
2. identify the need of problem-solving techniques.
3. study the technique of data collection & its presentation, concept of correlation and regression.
4. understand basic concept of probability, distribution probabilities of different events and time series.

Credits=2	SEMESTER-I Course II-BAIT115: Computational Statistics-I	No. of hours per unit/ credits
UNIT I	Data Condensation, Presentation and Central Tendency	(8)
	Introduction to statistics, Primary and secondary data, Classification of primary and secondary data, Tabulation and Diagrammatic Representation of statistical data, Graphical Representation of data – Bar-charts, Pie-diagrams Histograms, Box plots, Measures of central tendency and dispersion, Examples.	
UNIT II	Correlation and Regression	(8)
	Concept of correlation, Karl Pearson's coefficient of correlation, Correlation coefficient for A bivariate frequency distribution, Rank correlation, Concept of Regression, Properties of regression coefficient.	
UNIT III	Probability & Conditional Probability	(8)
	Events and sets, Sample space, Concept of probability, Addition and multiplications Theorem on probability, Conditional probability and independence of events, Baye's Theorem, Concept of random variable, Mathematical Expectation.	
UNIT IV	Time Series	(6)
	Concept of Time series, Analysis of Time Series, Component of time series, Secular and Cyclic Trend, Seasonal and Irregular Variation, Methods of measuring trends, Moving Average Method, Progressive Average Method, Least Square Method.	

Course Outcomes: Students will be able to...

1. evaluate the graph and types of graphs, representation of graphs.
2. develop matrices and its types, eigen values and eigen vectors.
3. explain events, sample space, probabilities and conditional probability.
4. analyze the measure trends of time series.

Reference Books:

1. Parimal Mukhopadyay(2011), An Introduction to the Theory of Probability (World Scientific Publishing Company).
2. S.P. Gupta(2011),Statistical Methods, Sultan Chand and sons Publications, 4th Edition.
3. Dr. S. Arumugam and A. Dhandapani Issac,(2002),Statistics, New Gamma Publication house.
4. Kishor S. Trivedi (1997), Probability and statistics with reliability queuing and Computer Science Applications - Prentice Hall of India (P) Ltd., New Delhi.

5. P. S. Grewal(1990), Methods of Statistical Analysis (Sterling Publishers).

Practical-I

Lab Course I: BAIP116: Minor Practical-I

Course Objectives: Students should be able to...

1. learn algorithm, Flowchart and Pseudo code with Examples.
2. understand the fundamentals of operating systems.
3. define computer programming and its role in mathematics problem solving.
4. identify programming skills using the fundamentals and basics of Python Language.

Credits=2	SEMESTER-I Lab Course I- Minor Practical-I	No. of hours per unit/ credits (60)
Part A:	Fundamentals of Computer	
	<ol style="list-style-type: none"> 1. Identification of the peripherals of a computer, components in a CPU and their functions. 2. Assembling and disassembling the system hardware components of personal computer. 3. Basic Computer Hardware Trouble shooting. 4. Study of internet basics 5. Familiarization of Basic Software – Operating System, Word Processors. 6. Study of Internet Browsers, Integrated Development Environment (IDE) with Examples. 7. Verify the components of a typical computer system. 8. Study of number systems. 9. Study of HTML tags 10. Study of table tags, ordered and unordered lists. 	
Part B:	Computational Statistics-I	
	<ol style="list-style-type: none"> 11. Graphical Representation I (Using Python) 12. Graphical Representation II (Using Python) 13. Measures of Central Tendency. (Using Python) 14. Measures of dispersion. (Using Python) 15. Programs on Correlation 16. Programs on Regression 17. Application of Probability and Conditional probability 18. Application on Baye’s Theorem 19. Time Series trend by progressive averages, moving averages methods. 20. Time Series trend by least square methods. 	

Course Outcomes: - Students will able to...

1. evaluate introduction of computers, classification of computers, anatomy of computer.
2. explain Study of constituents and architecture, microcontrollers.
3. learn solve mathematics problems using Python Language.

4. demonstrate simple arithmetic operations using Python.

Reference Books:

1. J. Glenn Brook shear,(2015),” Computer Science: An Overview”, Addison-Wesley, Twelfth Edition
2. David Riley and Kenny Hunt(2014), Computational thinking for modern solver, Chapman & Hall/CRC
3. Seymour Lipschutz, Marc Lars Lipson Schaum’s Outlines(2012), Discrete Mathematics, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint.
4. Kenneth. H. Rosen(2012) Discrete Mathematics and its applications, Seventh Edition, Mc Graw Hill Publishing Company.
5. Pradeep K. Sinha and Priti Sinha(2010), Computer Fundamentals (Sixth Edition), BPB Publication
6. M. Venkataraman, N. Sridharan and N. Chandrasekaran(2009), Discrete Mathematics, The National Publishing Company.
7. R.G. Dromey,(2005), “How to solve it by Computer”, PHI.

Semester – I

OE Course - I: Introduction to Museum

Course Objectives: Students should be able to...

1. recall concept of museum.
2. state importance of museum
3. understand development of museum in various era.
4. remember role of museum in society, research and education

Credits (Total Credits 2)	SEMESTER– I OE Course – I Introduction to Museum	No. of hours per Unit
Unit – I	Introduction i) Concept and Definitions of Museums ii) Scope and nature of Museum iii) Importance of Museum	(07)
Unit – II	Development of Museum in India i) Ancient ii) Medieval iii) Modern	(08)
Unit – III	Types of Museums – i) Classification of the museum on the basis of collections, governing body and scope etc. ii) Open air museums, inclusive museums, community center, iii) Interpretation center, galleries and virtual museums	(08)
Unit - IV	Role of Museum i) Society ii) Research iii) Education	(07)

Course Outcomes: Students will be able to,

1. Discuss about scope and nature of museum.
2. Classify Ancient, Medieval and Modern development of museum in India.
3. Differentiate various development of museum.
4. Identify role of museum.

Reference Book

1. Seth Manvi (2012): Communication and Education in Indian Museums. Agam Kala Prakashan, New Delhi.
2. Agrawal Usha (2000): Directory of Museums in India, New Delhi
3. Black G. (2005): The Engaging Museum: Developing Museums for Visitor Involvement, London, Routledge
4. Bobade B. R., Museums A New Era of Technology, B. R. Publishing, Delhi, ISBN

OE Course - II: Study and Importance of the

Museum Course Objectives: Students should be able to...

1. define and understand importance of museum.
2. understand the concept of local museum.
3. enlist the various types of museum.
4. remember difference between local, regional, state and national and International levels museum.

Credits (Total Credits 2)	OE Course – II Study and Importance of the Museum	No. of hours per Unit
Unit – I	Local Museums i) Shri. Chhatrapati Shivaji Maharaja Museum, Satara ii) Town Hall Museum, Kolhapur iii) Shri. Bhawani Museum and Library, Aundh (Satara).	(08)
Unit – II	Regional Museums i) Raja Dinkar Kelkar Museum, Pune ii) History Museum of Aurangabad iii) Central Museum, Nagpur	(08)
Unit – III	State and National Museum i) Chhatrapati Shivaji Maharaja Museum, Mumbai ii) Salarjang Museum, Hudrabad iii) National Museum, New Delhi	(07)
Unit – IV	International Museum i) The British Museum, London ii) Shanghai Science and Technology Museum iii) The Metropolitan Museum, New York	(07)

Course Outcomes: Students will be able to...

1. define and explain essential importance of the museum study.
2. discuss specific facts, dates and names associated with the museum.
3. identify and describe the main features of the museum galleries.
4. apply museum based knowledge to create educational material or exhibits that engage and inform visitors.

Reference Book

1. Bobade B. R., Museums a Guide to Preservation and Fumigation, Pacific Publication, Delhi, ISBN 978-93-81630-35-8
2. Bobade B. R., Museums and Archives - Preservation Management and Digital networking, Pacific Publication, Delhi, ISBN 978-93-50501-81-8
3. Agrawal Usha (2000): Directory of Museums in India, New Delhi

Democracy, Election and Good Governance

Learning objectives: Students should be able to.....

1. Introduce the meaning of democracy and it's important.
2. Study the various approaches of democracy and governance.
3. Understand the election procedure in India.
4. Learn the role of the good Governance and its initiatives in India.

Name of Course: Democracy, Election and Good Governance (DEGG)

Unit	Title	No. of hours per unit
Unit I	Democracy in India Introduction: Meaning, Definition of democracy	8
Unit II	Democracy and Decentralization – Dimensions of Democracy: Social, Economic and Political – Decentralization: Grassroots Level Democracy – Challenges before Democracy: women and marginalized sections of the society	8
Unit III	Election – 73rd and 74th Constitutional Amendment Acts: Institutions at the local level and Role of State Election commission – Local Body Elections: Urban & Rural – Duties of an Individual towards electoral process	8
Unit IV	Good Governance – Meaning and concept – Government and Governance – Good Governance initiatives in India	6

Learning outcomes: students will be able to.....

1. Explain the meaning of democracy and it's important.
2. Describe the various approaches of democracy and governance.

3. Examine critically election process in the country.

Define the role of the good Governance and its initiatives in India.

References:

- Banerjee-Dube, I, A history of modern India, Cambridge University Press, (2014).
- Basu, D. D. ,Introduction to the Constitution of India, Delhi: Prentice Hall of India,(1982).
- Bhargava, R, Political theory: An introduction. Chennai: Pearson EducationIndia, (2008).
- Bhargava, R., &Vanaik, A, Understanding Contemporary India: CriticalPerspective. New Delhi: Orient Blackswan, (2010).
- Chandhoke, N., &Proyadardhi,P. (Ed.), Contemporary India: Economy, Society,Politics. Chennai: Pearson Education India, (2009).
- Chandra, B, Essays on contemporary India, New Delhi: Har-AnandPublications Pvt Ltd, (1999).
- Chaterjee, P, State and Politics in India. New Delhi: Oxford university Press. (1997).

Dasgupta. S., (Ed.). Political Sociology. Chennai: Pearson Education India,(2011).

Indian Knowledge System

(IKS)

IKS101: History of Computers in India

Course Objectives: Student should be able to...

- 1) understand design for a steam-powered, mechanical computer.
- 2) learn digital computing replaced analog methods.
- 3) study the evolution of indian programming languages
- 4) identify the story behind the modern computing

Credits=2	SEMESTER-I History of Computers in India	No. of hours per unit/ credits
Unit I	Pre-Independence Era of Computers Introduction: Computing in the Pre-industrial World, Establishment of the Tata Institute of Fundamental Research, Analog Computing in the 19th and early 20th, Introduction of electronic computers in India, Information Technology before 1945	7
Unit II	Early Computing Initiatives Development of the first indigenous electronic computer: HEC-2M, Role of F.C. Kohli in setting up the first computer manufacturing company in India, Computers and Culture in the 1960s, Early Computer Languages and Software	7
Unit III	Era of Mainframes and Minicomputers Introduction of mainframe and minicomputer technologies in India, Role of the Department of Electronics (DoE) in promoting computerization, Evolution of Indian programming languages (FORTRAN, COBOL)	8
Unit IV	Modern Computing Emergence of Indian IT companies and software exports, Role of NRIs in the growth of the Indian IT industry, Internet and Digital Revolution, Mobile computing and smartphone revolution in India, Artificial Intelligence (AI) and Machine Learning (ML) in Indian industries	8

Course Outcomes: - Student will be able to ...

- 1) design for a steam-powered, mechanical computer.
- 2) evaluate digital computing replaced analog methods.
- 3) gain the knowledge about evolution of Indian programming languages.
- 4) elaborate the story behind the modern computing.

Reference Books:

1. Martin Campbell-Kelly and William Aspray(2004),Computer: A History of theInformation Machine
2. Fred Turner(2006), Counterculture to Cyberculture (University of Chicago Press)
3. Martin Campbell-Kelly(2003),Airline Reservations to Sonic the Hedgehog: AHistoryof the Software Industry (MIT Press)
4. Janet Abbate(1999), Inventing the Internet, (MIT Press)

B.Sc.I- Semester-II

Major- I

Theory: Course I: BAIT121: Object Oriented Programming using python

Course Objectives: Students should be able to...

1. learn fundamental concepts of objects.
2. Study of principles of programming.
3. understand the concept of object-oriented programming like classes, constructors, Polymorphism, inheritance, and file handling.
4. identify the open source libraries.

Credits=2	SEMESTER-II	No. of hours per unit/ credits
	Course I: BAIT121: Object Oriented Programming using python	
UNIT I	Introduction to Object Oriented Programming	(8)
	Features of Object oriented programming system (OOPS) – Classes and Objects, Encapsulation, Abstraction, Inheritance, Polymorphism, Classes and Objects: Creating a class, The Self variable, Constructor, Types of Variable, Namespaces, Types of Methods, Inheritance and Polymorphism – Constructors in inheritance, the super() method, types of inheritance, polymorphism, abstract classes and interfaces	
UNIT II	Strings, functions and Python libraries	(8)
	Strings: Creating strings and basic operations on strings, string-testing methods. Functions: Defining a function, Calling a function, returning multiple values from a function, functions are first class objects, formal and actual arguments, positional arguments, recursive functions, Basics of open-source libraries for data preprocessing, modelling and visualization, Using Python to Access Web Data Regular Expressions, Extracting Data, Sockets, Using the Developer Console to Explore HTTP, Retrieving Web Page, Parsing Web Pages Module	
UNIT III	Exception Handling	(6)
	Exception: Errors in a Python program, exceptions, exception handling, types of exceptions, the except block, the assert statement, user-applyd exceptions	
UNIT IV	Graphical User Interface and databases	(8)
	GUI in Python: The root window, fonts and colors, working with containers, Canvas, Frames, Widgets – Button widget, Label widget, message widget, text widget, radio button widget, entry widget, Using Databases, Single Table CRUD, Designing and Representing a Data Model, Inserting Relational Data, Reconstructing Data with JOIN, Many to Many Relationships.	

Course Outcomes: - Students will be able to...

1. evaluate the basic concepts of OOPs.
2. apply different Python library to solve programming problems.
3. explain the advanced concepts of python and apply for accessing databases and web data.
4. analyze APIs and third-party libraries to be used with Python.

Reference Books:

1. Robert Sedgewick, Kevin Wayne, Robert Dondero(2016), “Introduction to Programming in Python: AnInter-Disciplinary Approach”, Pearson India Education Services Pvt. Ltd.,
2. Timothy A. Budd,(2015),” Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,
3. Charles Dierbach,(2013) “Introduction to Computer Science using Python: A Computational Problem Solving Focus”, Wiley India Edition
4. Kenneth A. Lambert,(2012), “Fundamentals of Python: First Programs”, CENGAGE Learning.
5. Michael H.Goldwasser, David Letscher,(2007), “Object Oriented Programming in Python”, Prentice Hall, 1st Edition

B.Sc. I- Semester-II

Theory: Course II: BAIT122: Database Systems

Course Objectives: Students should be able to...

1. understand various basics of DBMS and query languages.
2. learn different types of database systems and their applications in different scenarios.
3. identify the process of drawing the ER-Diagrams.
4. study of the importance of database analysis and learn any database application.

Credits=2	SEMESTER-II Course II: BAIT122: Database Systems	No. of hours per unit/ credits
UNIT I	Introduction Characteristics and fundamental concepts of Databases, Types of Data Models and Data Modelling, Elements of Database Systems, Classification and comparison of Database Management Systems (Regular and NoSQL Page), concurrency control, Lock based concurrency control, Time stamping methods	(8)
UNIT II	Structured and semi-structured data management Structured data, relational databases, Relational model, Functional Dependencies, normal forms, algorithms for query optimization, Semi-structured data, document-databases, semi-structured data abstraction, representation and search	(7)
UNIT III	Transaction Management Transaction concept, transaction state, ACID properties, serializability, Recoverability, Implementation of Isolation, Testing for serializability	(7)
UNIT IV	Unstructured Data Management and Big Data Management Unstructured text, Information retrieval systems, document retrieval and ranking, Platforms for Big Data, algorithms for Map-Reduce & Hadoop, Platforms for Big Graphs, algorithms for large graphs.	(8)

Course Outcomes: - Students will be able to...

1. apply the basics of databases and data management.
2. evaluate various theoretical and practical principles involved in the design and use of databases systems with the help of database
3. design and implement databases for various scenarios.
4. modify database scenario for handling big data.

Reference Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan,(2006), Database System Concepts, Tata McGraw Hill
2. Elmsari and Navathe(2013), Fundamentals of Database Systems, Pearson Education.
3. Ramakrishnan and Gehrke,(2003), Database Management Systems, McGrawHill

4. C.J.Date, A.Kannan, S.Swamynathan, (2006),“An Introduction to Database Systems”, Pearson Education
5. R.P. Mahapatra(2016), Database Management Systems, Khanna Book Publishing.

Practical-II

Lab Course-II: BAIP123: Major Practical-II

Course Objectives: Students should be able to...

1. learn principles of programming.
2. understand the concept of object-oriented programming like classes, constructors, Polymorphism, inheritance, and file handling.
3. study of how to implement databases for various scenarios.
4. identify the design a database scenario for handling big data.

Credits=2	SEMESTER-II Lab Course-II: BAIP123: Major Practical-II	No. of hours per unit/ credits(60)
Part A :	Object Oriented Programming using python	
	<ol style="list-style-type: none">1. Write a NumPy program to compute the cross product of two given vectors2. Write a NumPy program to calculate the QR decomposition of a given matrix3. Write a Pandas program to convert a Panda Module Series to Python list and it's type.4. Write a Pandas program to convert a NumPy array to a Pandas series5. Implement the concept of Classes and objects6. Implement the concept of inheritance7. Implement the concept of polymorphism8. Write a menu-driven program to create mathematical 3D objects<ol style="list-style-type: none">I. curveII. sphereIII. coneIV. arrowV. ringVI. Cylinder.9. WAP to read n integers and display them as a histogram.10. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.	
Part B :	Database systems	

	<ol style="list-style-type: none">11. Implement normal forms in a database.12. Implement basic SQL commands on a database.13. Programs on relational models14. Implementation of queries and subqueries15. Implement information and raking using any language.16. Implement document retrieval and ranking using any algorithm.17. Programs on serializability.18. Programs on concurrency control.19. Implement different algorithm using Hadoop.20. Implement Map-reduce algorithm on any big data task.	
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Course Outcomes: - Students will be able to...

1. explain basic principles of Python programming language
2. implement database and GUI applications.
3. demonstrate normalization techniques with simple examples.
4. describe transaction processing and concurrency control concepts.

Reference Books:

1. Robert Sedgewick, Kevin Wayne, Robert Dondero, (2016), "Introduction to Programming in Python: An Inter-Disciplinary Approach", Pearson India Education Services Pvt. Ltd.,
2. Timothy A. Budd (2015), "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,
3. Charles Dierbach, (2013), "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition
4. Kenneth A. Lambert (2012), "Fundamentals of Python: First Programs", CENGAGE Learning.
5. David L. Poole and Alan K. Mackworth, (2010), Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press.

B.Sc.I- Semester-II

Minor Paper

Theory: Course I: BAIT121: Object Oriented Programming using python

Course Objectives: Students should be able to...

1. learn fundamental concepts of objects.
2. Study of principles of programming.
3. understand the concept of object-oriented programming like classes, constructors, Polymorphism, inheritance, and file handling.
4. identify the open source libraries.

Credits=2	SEMESTER-II	No. of hours per unit/ credits
UNIT I	Introduction to Object Oriented Programming	(8)
	Features of Object oriented programming system (OOPS) – Classes and Objects, Encapsulation, Abstraction, Inheritance, Polymorphism, Classes and Objects: Creating a class, The Self variable, Constructor, Types of Variable, Namespaces, Types of Methods, Inheritance and Polymorphism – Constructors in inheritance, the super() method, types of inheritance, polymorphism, abstract classes and interfaces	
UNIT II	Strings, functions and Python libraries	(8)
	Strings: Creating strings and basic operations on strings, string-testing methods. Functions: Defining a function, Calling a function, returning multiple values from a function, functions are first class objects, formal and actual arguments, positional arguments, recursive functions, Basics of open-source libraries for data preprocessing, modelling and visualization, Using Python to Access Web Data Regular Expressions, Extracting Data, Sockets, Using the Developer Console to Explore HTTP, Retrieving Web Page, Parsing Web Pages Module	
UNIT III	Exception Handling	(6)
	Exception: Errors in a Python program, exceptions, exception handling, types of exceptions, the except block, the assert statement, user-applied exceptions	
UNIT IV	Graphical User Interface and databases	(8)
	GUI in Python: The root window, fonts and colors, working with containers, Canvas, Frames, Widgets – Button widget, Label widget, message widget, text widget, radio button widget, entry widget, Using Databases, Single Table CRUD, Designing and Representing a Data Model, Inserting Relational Data, Reconstructing Data with JOIN, Many to Many Relationships.	

Course Outcomes: - Students will be able to...

1. evaluate the basic concepts of OOPs.
2. apply different Python library to solve programming problems.
3. explain the advanced concepts of python and apply for accessing databases and web data.
4. analyze APIs and third-party libraries to be used with Python.

Reference Books:

1. Robert Sedgewick, Kevin Wayne, Robert Dondero(2016), “Introduction to Programming in Python: AnInter-Disciplinary Approach”, Pearson India Education Services Pvt. Ltd.,
2. Timothy A. Budd,(2015),” Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,
3. Charles Dierbach,(2013) “Introduction to Computer Science using Python: A Computational Problem Solving Focus”, Wiley India Edition
4. Kenneth A. Lambert,(2012), “Fundamentals of Python: First Programs”, CENGAGE Learning.
5. Michael H.Goldwasser, David Letscher,(2007), “Object Oriented Programming in Python”, Prentice Hall, 1st Edition

B.Sc. I- Semester-II

Theory: Course II: BAIT122: Database Systems

Course Objectives: Students should be able to...

1. understand various basics of DBMS and query languages.
2. learn different types of database systems and their applications in different scenarios.
3. identify the process of drawing the ER-Diagrams.
4. study of the importance of database analysis and learn any database application.

Credits=2	SEMESTER-II Course II: BAIT122: Database Systems	No. of hours per unit/ credits
UNIT I	Introduction Characteristics and fundamental concepts of Databases, Types of Data Models and Data Modelling, Elements of Database Systems, Classification and comparison of Database Management Systems (Regular and NoSQL Page), concurrency control, Lock based concurrency control, Time stamping methods	(8)
UNIT II	Structured and semi-structured data management Structured data, relational databases, Relational model, Functional Dependencies, normal forms, algorithms for query optimization, Semi-structured data, document-databases, semi-structured data abstraction, representation and search	(7)
UNIT III	Transaction Management Transaction concept, transaction state, ACID properties, serializability, Recoverability, Implementation of Isolation, Testing for serializability	(7)
UNIT IV	Unstructured Data Management and Big Data Management Unstructured text, Information retrieval systems, document retrieval and ranking, Platforms for Big Data, algorithms for Map-Reduce & Hadoop, Platforms for Big Graphs, algorithms for large graphs.	(8)

Course Outcomes: - Students will be able to...

1. apply the basics of databases and data management.
2. evaluate various theoretical and practical principles involved in the design and use of databases systems with the help of database
3. design and implement databases for various scenarios.
4. modify database scenario for handling big data.

Reference Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan,(2006), Database System Concepts, Tata McGraw Hill
2. Elmsari and Navathe(2013), Fundamentals of Database Systems, Pearson Education.
3. Ramakrishnan and Gehrke,(2003), Database Management Systems, McGrawHill

4. C.J.Date, A.Kannan, S.Swamynathan, (2006),“An Introduction to Database Systems”, Pearson Education
5. R.P. Mahapatra(2016), Database Management Systems, Khanna Book Publishing.

Practical-II

Lab Course-II: BAIP123: Minor Practical-II

Course Objectives: Students should be able to...

1. learn principles of programming.
2. understand the concept of object-oriented programming like classes, constructors, Polymorphism, inheritance, and file handling.
3. study of how to implement databases for various scenarios.
4. identify the design a database scenario for handling big data.

Credits=2	SEMESTER-I Lab Course-II: BAIP123: Minor Practical-II	No. of hours per unit/ credits(60)
Part A :	Object Oriented Programming using python	
	<ol style="list-style-type: none">1. Write a NumPy program to compute the cross product of two given vectors2. Write a NumPy program to calculate the QR decomposition of a given matrix3. Write a Pandas program to convert a Panda Module Series to Python list and it's type.4. Write a Pandas program to convert a NumPy array to a Pandas series5. Implement the concept of Classes and objects6. Implement the concept of inheritance7. Implement the concept of polymorphism8. Write a menu-driven program to create mathematical 3D objects<ol style="list-style-type: none">I. curveII. sphereIII. coneIV. arrowV. ringVI. Cylinder.9. WAP to read n integers and display them as a histogram.10. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.	
Part B :	Database systems	

	<ol style="list-style-type: none">11. Implement normal forms in a database.12. Implement basic SQL commands on a database.13. Programs on relational models14. Implementation of queries and subqueries15. Implement information and raking using any language.16. Implement document retrieval and ranking using any algorithm.17. Programs on serializability.18. Programs on concurrency control.19. Implement different algorithm using Hadoop.20. Implement Map-reduce algorithm on any big data task.	
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Course Outcomes: - Students will be able to...

1. explain basic principles of Python programming language
2. implement database and GUI applications.
3. demonstrate normalization techniques with simple examples.
4. describe transaction processing and concurrency control concepts.

Reference Books:

1. Robert Sedgewick, Kevin Wayne, Robert Dondero, (2016), "Introduction to Programming in Python: An Inter-Disciplinary Approach", Pearson India Education Services Pvt. Ltd.,
2. Timothy A. Budd (2015), "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,
3. Charles Dierbach, (2013), "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition
4. Kenneth A. Lambert (2012), "Fundamentals of Python: First Programs", CENGAGE Learning.
5. David L. Poole and Alan K. Mackworth, (2010), Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press.

OE Course - III: Museum Management**Course Objectives: Students should be able to...**

1. recall the fundamental principles and concepts of museum management.
2. remember key terms and definitions related to museum administration.
3. memorize the role and responsibilities of various position within a museum.
4. understand the function and goals of museum management.

Credits (Total Credits 2)	SEMESTER – II OE Course – III Museum Management	No. of hours per Unit
Unit – I	Location and Surrounding of Museums i) Selection or site and surrounding ii) Use of space, design and planning iii) Construction of museum iv) Special Problems (war. flood, fire & earth quake etc.) v) Contact with professional agencies.	(06)
Unit – II	Administrative Set up i) Structure ii) Responsibilities iii) Institution and professional organizations	(08)
Unit – III	Marketing Management i) Policies and techniques ii) Public relations iii) Funding sources (Central Government, State Government and Private)	(08)
Unit – IV	Collection Management. i) Acquisition ii) Registration and documentation iii) Storage and transport of collection iv) Packing	(08)

Course Outcomes: Students will be able to...

1. discuss relevant laws, regulations and ethical guidelines for museum management.
2. explain the purpose and objective of museum management.
3. summarize the key components of museum grants.
4. analyze the impact of external factors such as funding sources on museum management decision.

Reference Book:

1. Seth Manvi (2012): Communication and Education in Indian Museums. Agam Kala Prakashan, New Delhi.
2. Agrawal Usha (2000): Directory of Museums in India, New Delhi
3. Black G. (2005): The Engaging Museum: Developing Museums for Visitor Involvement, London, Routledge
4. Bobade B. R., Museums A New Era of Technology, B. R. Publishing, Delhi, ISBN 978-93-86223-05-0

OE Course - IV: Preventive Conservation of Museum

Course Objectives: Students should be able to...

1. recall the basic principles and concepts of preventive conservation in museums.
2. remember key terms and definitions related to museum conservation and preservation.
3. memorize the factors that contribute to the deterioration of museum objects and collections.
4. understand the importance of preventive conservation in maintaining the longevity and integrity of museum objects.

Credits (Total Credits 2)	OE Course – IV Preventive Conservation of Museums	No. of hours per Unit
Unit – I	Introduction to Preventive Conservation i) Definition and technologies ii) Basic tools and equipment iii) Role of Curator and Conservator	(07)
Unit – II	Classification and Characteristic i) Classification of Museums objects ii) Characteristics of objects iii) Identification of Museum objects iv) Guideline for handling objects	(08)
Unit – III	Ethics of Conservation i) Traditional methods of Preventive Conservation ii) Trading Opportunities in the field of Conservation iii) Professional organizations related to conservation	(07)
Unit – IV	Different type of Preservation techniques i)Methods of wet preservation. ii)Wet Preservation of plants. iii) Wet preservation of Animals. iv) Color preservation techniquesv)Alizarin mounts	(08)

Course Outcomes: Students will be able to...

1. explain the factors that contribute to the deterioration of museum objects and collections.
2. discuss the guidelines and protocols for handling and storing museum artifacts.
3. summarize the main causes and agents of deterioration in museum collections, including environmental factors, pests, and improper handling.

4. apply proper handling and storage techniques to minimize damage and deterioration.

Reference Book:

1. Bobade B. R., Museums a Guide to Preservation and Fumigation, Pacific Publication, Delhi, ISBN 978-93-81630-35-8
2. Bobade B. R., Museums and Archives - Preservation Management and Digital networking, Pacific Publication, Delhi, ISBN 978-93-50501-81-8
3. Agrawal Usha (2000): Directory of Museums in India, New Delhi
4. Black G. (2005): The Engaging Museum: Developing Museums for VisitorInvolvement, London, Routledge

Skill Enhancement Course (SEC) Semester – II

SEC103: Paper - I: Linux Programming

Course Objectives: Students should be able to...

1. learn principles of operating systems including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands,
2. study of inter process communication.
3. understand semaphore and shared memory.
4. identify the basic linux commands, scripts and filters.

Credits (Total Credits 1)	SEMESTER – II SEC Paper – I Linux Programming	No. of hours per unit(15)
Unit - I	Introduction to Linux and Linux Utilities: - brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor. Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin. Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, dif1, tr, awk, cpio	(08)
Unit – II	Introduction to Shells: - Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands.	(07)

Course Outcomes: Students will be able to...

1. use various Linux commands that are used to manipulate system operations at admin level.
2. create and write shell programming using linux commands.
3. design and write application to manipulate internal kernel level linux File System.
4. develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

Reference Books:

1. Daniel J. Barrett (2016), Linux Pocket Guide,3rd edition,O'Reilly Media, 1005 Gravenstein Highway North, Sebastopol, CA 95472.
2. William Shotts(2019),The Linux Command Line, 2nd edition,No Starch Press publication.
3. Jason Cannon(2013),Linux for Beginners,1st edition, Independently Published
4. Richard Blum (2015), Linux Command Line and Shell Scripting Bible, 3rd edition,Wiley.
5. Kung Fu, Jason Cannon (2014), An Introduction to the Linux Operating System andCommand Line,1st edition, Independently Published

Semester-II

SEC103 Practical Paper - I: Linux Programming

Course Objectives: Students should be able to...

1. study the principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands.
2. understand Inter process communication.
3. identify semaphore and shared memory.
4. learn the basic Linux commands, Scripts and filters.

Credits (Credits=1)	SEMESTER – II SEC103 Practical Paper - I Linux Programming List of Practical's	No. of hours per Practical (15)
1	Write a Linux script to find the number of users who have logged in.	
2	Write a Linux script to see the current date, user name and current directory	
3	Write a Linux script to print the numbers 5,4,3,2,1 using While loop.	
4	Write a Linux script to set the attributes of a file.	
5	Write a Linux script to convert lowercase to uppercase using trutility.	
6	Write a Linux script to copy and rename a file.	
7	Write a Linux script to add 5 numbers and find the average.	

8	Write a Linux script to convert a decimal number to hexadecimal conversion.
9	Write a Linux script to find the factorial of a number.
10	Write a Linux script to check for palindrome.

Course Outcomes: Students will be able to...

1. use various linux commands that are used to manipulate system operations at admin level.
2. create and write Shell Programming using Linux commands.
3. design and write application to manipulate internal kernel level Linux File System.
4. develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

Reference Books:

1. Daniel J. Barrett (2016), Linux Pocket Guide, 3rd edition, O'Reilly Media, 1005 Gravenstein Highway North, Sebastopol, CA 95472.
2. William Shotts (2019), The Linux Command Line, 2nd edition, No Starch Press publication.
3. Jason Cannon (2013), Linux for Beginners, 1st edition, Independently Published
4. Richard Blum (2015), Linux Command Line and Shell Scripting Bible, 3rd edition, Wiley.
5. Kung Fu, Jason Cannon (2014), An Introduction to the Linux Operating System and Command Line, 1st edition, Independently Published.

B. Sc. I (Sem II): VEC syllabus

Course Objectives: Students should be able to,

1. understand and appreciate core human values
2. give Individuals of strong character who exhibit integrity and moral courage.
3. promote gender equity in computer science.
4. understanding the historical, cultural, and social contexts in which computer science has evolved is essential for appreciating its full significance.

SEMESTER -II	
Credits=2	BAIT-VEC-I: Role of Values and Ethics in Artificial Intelligence
Unit - 1	Universal Human values Truth, Harmony, Compassion and Justice, Respect, Tolerance, Co-operation, Freedom, Responsibility, Solidarity, Empathy, Dignity and Peace.
Unit - 2	Ethical conduct and Ethical reasoning in Artificial Intelligence Ethical conduct at work, Ethical reasoning and issues, principles of ethical reasoning, Privacy and Data Security, Transparency and Accountability, Intellectual Property, Fairness and Bias, Human Rights and Social Impact, Professional Responsibility, Codes of Ethics.
Unit - 3	Importance of gender equity in Artificial Intelligence Equal Opportunity, Fighting Stereotypes, Role Models and Mentoring, Addressing Biases in Technology, Global Competitiveness, Legal and Ethical Imperative, Improved Workplace Culture.
Unit - 4	Importance of culture and heritage in the development of Artificial Intelligence Historical Context, Diversity of Perspectives, Language and Terminology, Educational System, Workplace Culture, Global Collaboration, Preservation of Heritage

Course Outcomes: Students should be able to,

1. develop a deep understanding of the ethical foundations that field of artificial Intelligence

2. capable of assessing the ethical implications of artificial intelligence (AI) and automation technologies, and they will be able to design AI systems that prioritize fairness, transparency, and accountability.
3. prepared to take on leadership roles in promoting ethical behaviour in the field of artificial Intelligence
4. aware of the social and environmental impact of technology

Reference Book

1. Jason Merchev , 2009, "**The Values of the Wise: Humanity's Highest Aspirations**"
2. Deborah G. Johnson and Helen Nissenbaum, , 2009, "**Computer and Information Ethics**"
3. Michael J. Quinn ,2020, "**Ethics for the Information Age**"
4. Emily Chang , 2018, "**Brotopia: Breaking Up the Boys' Club of Silicon Valley**"
5. Elissa Shevinsky , 2015 ,"**Lean Out: The Elitism and Exploitation of the Tech Industry**"
6. Clive Thompson, 2019, "**Coders: The Making of a New Tribe and the Remaking of the World**".

You may refer the following websites for more reference

https://fdp-si.aicte-india.org/download/HVBE_for_NEP2020.pdf

Evaluation structure:

- Internal Evaluation (20 Marks)
- Seminar/group discussion/quiz/Survey End semester Exam (30 marks)

