



**JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T. LALVANI COLLEGE OF COMMERCE
(AUTONOMOUS)**

"A" Road, Churchgate, Mumbai - 400 020, India.

**Affiliated to
University of Mumbai**

Program : B.Voc

Proposed Course: Software Development

Semester I

**CBCS NEP Based Syllabus with effect from the academic
year 2023-24**

FYUGP Credit Structure from 2023-24 (Across All courses)										
Level	Sem	Major (Sub-1)	Elective	Minor (Sub-2)	OE	VSC	IKS Generic	OJT, FP, RP, CEP	Cum Cr/Sem	Degree/Cum Cr
						SEC	AEC, VEC	CC		
4.5 (2023-24)	Sem 1	4	0	4	4	4	6	0	22	44 UG certificate
	Sem 2	4	0	4	4	4	4	2	22	
	Cum Cr	8	0	8	8	8	10	2	44	
<p>A student will decide which of the 2 subjects (Sub-1 or Sub-2) will be major and minor at the end of the second semester (ie the first year) Major subject-specific IKS of 2 credits must be done as 2 units (could be 1 unit + 1 unit) from Sem 3 to Sem 6</p>										
Exit option with a UG Certificate in Major with an additional 4 credits core NSQF course/internship OR continue with Major & Minor										
5 (2024-25)	Sem 3	8	0	4	2	2	2	4	22	88 UG Diploma
	Sem 4	8	0	4	2	2	2	4	22	
	Cum Cr	24	0	16	12	12	14	10	88	
Exit option with a UG Diploma in Major & Minor with an additional 4 credits core NSQF course/internship OR continue with Major & Minor										
5.5 (2025-26)	Sem 5	12	4	2	0	2	0	2	22	132 UG Degree
	Sem 6	12	4	2	0	0	0	4	22	
	Cum Cr	48	8	20	12	14	14	16	132	
6 (2026-27)	Sem 7	12	4	4	0	0	0	2	22	176 UG Honours
	Sem 8	12	4	0	0	0	0	6	22	
	Cum Cr	72	16	20	12	14	14	24	176	
6 (2026-27)	Sem 7	10	4	4	0	0	0	4	22	176 UG Honours with Research
	Sem 8	10	4	0	0	0	0	8	22	
	Cum Cr	68	16	20	12	14	14	28	176	
Four-Year UG Honours with Research Degree with Major and Minor										

PI note: 1 credit = 15 hr of T and 30 hr of P T=Theory P=Practical (dry Lab or wet Lab)/Hands-on/Experiential learning



F.Y.BVOC (Software Development)

Academic year 2023-2024

Semester I					
	Course Code	Course Title	Lectures/Practicals	Credits	Total Credits
Major	JUSVSD-DSC101	Basics of Web Designing	45L/15P	3+1	4
Minor	JUSVSD-MIN101	Logics & Algorithms	45L/15P	3+1	4
Open Elective	JUSVSD-OE101	Financial Literacy	30L	2	2
	JUSVSD-OE102	Logic, Reasoning and Aptitude	30L	2	2
VSC	JUSVSD-VSC101	Introduction to Programming with C++	15L/15P	2	2
SEC	JUSVSD-SEC101	Modern Operating System	15L/15P	2	2
IKS	JUIKS-GEN101	Indian Knowledge Traditions	30L	2	2
VEC	JUSVSD-VEC101	Digital Literacy	30L	2	2
AEC	JUSVSD-AEC101	English Language Skills	30L	2	2

Major Course

Course Code: JUSVSD- DSC101	Course Title: Basics of Web Designing (Credits :03 Lectures/Week:03)	
	<p>Objectives:</p> <ul style="list-style-type: none"> ● Apply critical thinking and problem solving skills required to successfully design and implement a web site. ● Demonstrate the ability to analyze, identify and define the technology required to build and implement a web site. ● Demonstrate knowledge of artistic and design components that are used in the creation of a web site. ● Create, select, and apply various aspects of interactive websites, motion graphics, video and informational graphics with an understanding of the limitations. ● Able to acquire practical competency with emerging technologies and skills needed for becoming an effective web designer. <p>Outcomes:</p> <ul style="list-style-type: none"> ● This course introduces students to basic web design using HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets). □ Enhance web pages using text formatting, color, graphics, images, and multimedia. ● Use JavaScript and jQuery for adding effects and dynamic behaviour to web pages. ● Learn XML for handling data. 	
	THEORY	(45 lectures)
Unit I	<p>HTML5: Difference between HTML4.0 and HTML5, HTML Tags, Attributes and Elements, HTML Comments, HTML Colors, Working with Text and HTML Formatting, List Tags, Hyperlinks and anchors, Image & Image map, HTML Tables with formatting, HTML Form with attributes and input types, HTML Frames, HTML Iframes</p> <p>CSS: Basics of CSS: Introduction to CSS, CSS Syntax, CSS Selectors, CSS Colors, CSS Background, Fonts and Text with CSS, CSS links, Lists and Tables.</p>	15 L
Unit II	<p>CSS Box Model: CSS Dimension, Padding, Border and Margin. Advanced CSS: CSS Position, Float and Align; CSS Opacity, CSS Navigation Bar, Dropdowns, Image Gallery; CSS Counters.</p> <p>JavaScript: Basics of JavaScript: Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, Syntax, Operators, Conditional and Looping Statements, Function</p>	15 L
Unit III	<p>JavaScript Objects: Object, Number, String, Boolean, Array, Date, Math. Advanced: Document Object Model, Events and Event Handling, Form Validation.</p> <p>jQuery: Introduction: Syntax, Selectors, Events jQuery Effects: Hide/Show, Fade, Slide, Animate, Stop(), Callback, Chaining jQuery HTML: Get, Set, Add, Remove, CSS Classes, css(), Dimensions Traversing: Ancestors, Descendants, Siblings, Filtering</p>	15 L

Textbook:

1. Web Design the Complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML the Complete Reference, Thomas Powell, Tata McGrawHill
3. Styling with CSS by Charles Wyke-Smith
4. XML in a Nutshell, 3rd Edition, Elliotte Rusty Harold, W. Scott Means, O'Reilly Media, Inc.
5. JavaScript 2.0: The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider
6. jQuery Pocket Reference - David Flanagan.



<p>Course Code: JUSVSD-DSCPR10 1</p>	<p>Course Title: Basics of Web Designing Practical (Credits :01 Practicals/Week:01)</p> <p>1. Implement the following in HTML:</p> <ul style="list-style-type: none"> a) Design a web page using Formatting text b) Design a web page using List tag c) Design a web page using Table tag d) Design a web page using Form e) Design a web page using Frame and Multimedia. <p>2. Implement the following in CSS:</p> <ul style="list-style-type: none"> a) Design a webpage using inline, internal and external CSS. b) Design a webpage using Table tag so that the content appears well placed and apply CSS on it. c) Design a webpage using HTML forms that uses all types of control and style it with CSS. d) Design a webpage using CSS and display Horizontal and Vertical Navigation bar. <p>3. Implement the following in XML:</p> <ul style="list-style-type: none"> a) Design a XML document and display it in the browser using CSS. b) Design an XML document and display it in the browser using XSL. c) Design XML Schema and corresponding XML document. <p>4. Implement the following in JavaScript:</p> <ul style="list-style-type: none"> a) Write a javascript program which displays the working of operators. b) Write a javascript program which displays the working of control statements. c) Write a javascript program which displays the working of events and event handlers. <p>5. Implement the following in jQuery:</p> <ul style="list-style-type: none"> a) Write a program for Selectors. b) Write a program for Event Methods. c) Write a program for Effects d) Write a program for Traversing e) Write a program for HTML Elements & attributes.
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Minor Course

Course Code: JUSVSD- MIN101	Course Title: Logics & Algorithms (Credits :03 Lectures/Week:03)	
	Objectives: <ul style="list-style-type: none"> • Use mathematically correct terminology and notation. • Construct correct direct and indirect proofs. • Use division into cases in a proof. • Use counterexamples. • Apply logical reasoning to solve a variety of problems. Outcomes: To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.	
	THEORY	
Unit I	Number System: Decimal,Binary, Octal,Hexadecimal, number system conversion, arithmetic operations. Set Theory:Fundamentals - Sets and subsets, Venn Diagrams, Operations on sets, Laws of Set Theory, Power Sets and Products, Partition of set, The Principle of Inclusion - Exclusion. The Logic of Compound Statements: Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments Quantified Statements: Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements	(45 lectures) 15 L
Unit II	Relations, diagraphs and lattices: Product sets and partitions, relations and diagraphs, paths in relations and diagraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and diagraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice. Functions: Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Cardinality with Applications to Computability	15 L
Unit III	Graphs and Trees: Definitions and Basic Properties, Trails, Paths and Circuits, Matrix Representations of Graphs, Isomorphism's of Graphs, Trees, Rooted Trees, Isomorphism's of Graphs, Spanning trees and shortest paths. Counting and Probability: Introduction, Possibility Trees and the Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, rCombinations with Repetition Allowed, Probability Axioms and Expected Value, Conditional Probability, Bayes' Formula and Independent Events.	15 L
Textbooks: <ol style="list-style-type: none"> 1. Discrete Mathematics with Applications Sussana S. Epp Cengage Learning 4th 2010. 2. Discrete Mathematics, Schaum's Outlines Series Seymour Lipschutz, Marc Lipson Tata MCGraw Hill 2007 		

Course Code:	Course Title: Logics & Algorithms Practical (Credits :01 Practicals/Week:01)
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**JUSVSD-
MINPR10
1**

1. Set Theory
 - a) Inclusion Exclusion principle.
 - b) Power Sets.
 - c) Mathematical Induction.
2. Functions and Algorithms
 - a) Recursively defined functions
 - b) Cardinality
 - c) Polynomial evaluation
 - d) Greatest Common Divisor
3. Boolean Algebra
 - a) Basic definitions in Boolean Algebra
4. Properties of integers
 - a) Division algorithm
 - b) Primes
 - c) Euclidean algorithm
 - d) Fundamental theorem of arithmetic
 - e) Congruence relation
 - f) Linear congruence equation
5. Algebraic Systems
 - a) Properties of operations
 - b) Roots of polynomials
6. Recurrence relations
 - a) Linear homogeneous recurrence relations with constant coefficients
 - b) Solving linear homogeneous recurrence relations with constant coefficients Solving general homogeneous linear recurrence relations
7. Graph Theory
 - a) Paths and connectivity
 - b) Minimum spanning tree
 - c) Isomorphism
8. Directed Graphs
 - a) Adjacency matrix
 - b) Path matrix
9. Counting
 - a) Sum rule principle
 - b) Product rule principle
 - c) Factorial
 - d) Binomial coefficients
 - e) Permutations
 - f) Permutations with Repetition
 - g) Ordered partitions
10. Probability Theory
 - a) Sample space and events
 - b) Finite probability spaces
 - c) Equiprobable spaces
 - d) Addition Principle
 - e) Conditional Probability
 - f) Multiplication theorem for conditional probability
 - g) Independent events
 - h) Repeated trials with two outcomes

Open Elective Course

Course Code: JUSVSD -OE101	Course Title:Financial Literacy (Credits:02 Lectures/Week:02)	
	Objectives: <ul style="list-style-type: none"> • To understand the basic components of Financial Literacy such as savings, investment, taxation and insurance • To understand the importance of financial planning Outcomes: <ul style="list-style-type: none"> • Develop the ability to do personal and family financial planning • Build capability to analyze banking and insurance products • Learn basics of investment and tax planning 	
	THEORY	(30 lectures)
Unit – I:	Financial Literacy a) Five pillars of financial literacy – save, invest, budget, manage debt and tax planning b) Benefits of financial literacy Budgeting a) Income & expenses b) Setting priorities: difference between needs and wants c) Budgeting	10L
Unit – II	Saving a) Benefits of saving and financial discipline b) Methods of saving Investment a) Concept of time value of money and its importance b) Choosing between financial products to invest: Rate of return vs risk	10L
Unit – III	Financial goals a) Importance of financial goals b) Steps to set financial goals Personal tax planning a) Tax structure in India b) Need and importance of tax planning	10L

Textbooks:

1. Singh, Abhishek Kumar and Rajni (2022), Financial Literacy, Ist edition,JSR Publishing House LLP, India

2. Sinha, Madhu (2017), Financial Planning: A Ready Reckoner, McGraw Hill, USA

Suggested Readings:

3. The Richest Man in Babylon by George S. Clason

4. The Intelligent Investor by Benjamin Graham



Open Elective Course

Course Code: JUSVSD-OE102	Course Title:Logic, Reasoning and Aptitude (Credits:02 Lectures/Week:02)	
	Objectives: <ul style="list-style-type: none"> • Ability to use numbers and mathematical concepts to solve mathematical problems • Ability to analyze the data using data interpretation • Ability to solve verbal and non-verbal reasoning problems • Ability to understand and evaluate statement based problems Outcomes: <ul style="list-style-type: none"> • Will be able to analyze data, understanding technical reports • Improving decision-making and problem-solving skills. • Develop Critical Thinking Skills • Will be able to solve aptitude tests for gaining a career in the IT industry 	
	THEORY	(30 lectures)
Unit – I:	Picture Reasoning Verbal Reasoning Syllogism Input Output Critical Reasoning Statement Reasoning	10L
Unit – II	Tabular Graph Line Graph Pie Chart Bar Diagram Data Sufficiency Permutation and Combination	10L
Unit – III	Analytical Problems Relation Problem Arrangements Questions Decision Making Problems Comprehension of Technical Writing	10L

Textbooks:

1. Goleman, D. (1996) Emotional Intelligence: Why it Can Matter More Than IQ, Bloomsbury Publishing
2. A Modern Approach to Logical Reasoning by R.S. Aggarwal

Additional References:

3. Meah, M. (2011) Competency Questions Made Easy,Sapere Media.
4. Povah, N. &Povah, L.,(UK edn) (2009). Succeeding at Assessment Centres for Dummies, John Wiley &

Sons.

Vocational Skill Component

Course Code: JUSVSD -VSC101	Course Title: Introduction to Programming with C++ (Credits :02 Lectures/Week: 01)	
	Objectives: <ul style="list-style-type: none">• Understand the features of C++ supporting object-oriented programming• Understand how to apply the major object-oriented concepts to implement object-oriented programs in C++, encapsulation and polymorphism.• Understand advanced features of C++ specifically stream I/O, operator overloading, Inheritance paradigm.• Ability to handle possible errors during program execution. Outcomes: <ul style="list-style-type: none">• This course provides in-depth coverage of object-oriented programming principles and techniques. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance.	
	THEORY	(15 Lectures)
Unit I	Introduction: Structure of a program, Compilation and Execution of a Program, Character Set, identifiers and keywords, data types, constants, variables and arrays, declaration, expressions, statements, Variable definition. Operators and Expressions: Arithmetic operator, unary operators, relational and logical operators, assignment operators, the conditional operator. Conditional Statements and Loops: If Statement, If-Else Statement, While Loop, Do While, For Loop, Nested Loops, Infinite Loops, Switch Statement. Functions: Overview, defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes, Recursion. Pointers: Fundamentals, declarations, Pointers Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Functions and Pointers	5 L
UNIT II	Introduction to OOP: Need object-oriented programming, comparison of procedural and object-oriented approach, object, classes, polymorphism, inheritance, reusability, data hiding and abstraction, applications of OOPs. Classes and Objects: Class declaration, constructors, constructor initialization lists, access functions, private member functions, the copy constructor, the class destructor, pointers to objects, static data members, static function members, friend function. File Handling: Classes for file stream operations, opening and closing a file, detecting end of file, file modes, file pointers and their manipulations.	5 L

UNIT III	<p>Operator Overloading: Overloading the assignment operator, the THIS pointer, overloading arithmetic operators, overloading the arithmetic assignment operators, overloading the relational operators, overloading the increment and decrement operators, overloading the subscript operator.</p> <p>Inheritance: Inheritance, protected class members, overriding, private access verses protected access, virtual functions and polymorphism, virtual destructors, abstract base classes.</p>	5 L
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Object Oriented Analysis and Design, Timothy Budd (2012).: Tata McGraw Hill 2. Object Oriented Programming with C++, E. Balagurusamy.: Tata McGraw Hill 		



Course Code: JUSVSD- VSC101	<p>Course Title: Introduction to Programming with C++ (Practicals/Week:01)</p> <p>1. Basic Programs</p> <p>a) Write a program to display the message HELLO WORLD.</p> <p>b) Write a program to declare some variables of type int, float and double. Assign some values to these variables and display these values.</p> <p>c) Write a program to find the addition, subtraction, multiplication and division of two numbers.</p> <p>d) Write a program to swap two numbers without using third variable</p> <p>2. Conditional statements and loops(basic)</p> <p>a) Write a program to enter a number from the user and display the month name. If number >13 then display invalid input using switch case.</p> <p>b) Write a program to check whether the number is even or odd.</p> <p>c) Write a program to check whether the number is positive, negative or zero.</p> <p>d) Write a program to check whether the entered number is prime or not.</p> <p>e) Write a program to find the largest of three numbers.</p> <p>0. Conditional statements and loops(advanced)</p> <p>a) Write a program to find the sum of squares of digits of a number.</p> <p>b) Write a program to find the sum of numbers from 1 to 100.</p> <p>c) Write a program to print the Fibonacci series.</p> <p>d) Write a program to find the reverse of a number.</p> <p>e) Write a program to find whether a given number is palindrome or not.</p> <p>f) Write a program to check whether the entered number is Armstrong or not.</p> <p>0. Functions and Recursive Functions</p> <p>a) Function without parameter and without return type.</p> <p>b) Function without parameter and with return type.</p> <p>c) Function with parameter and without return type</p> <p>d) Function with parameter and with return type.</p> <p>e) Write a program to find the factorial of a number using a recursive function.</p> <p>0. Classes and methods</p> <p>a) Design an employee class for reading and displaying the employee information, the get Info() and display Info() methods will be used respectively. Where get Info() will be private method.</p> <p>b) Design the class Demo which will contain the following methods: read No() ,factorial() for calculating the factorial of a number, reverse No() will reverse the given number, is Palindrome() will check the given number is palindrome, is Armstrong() which will calculate the given number is arm Strong or not. Where read No() will be private method.</p> <p>0. Friend Functions</p> <p>a) Write a friend function for adding the two complex numbers, using a single class.</p> <p>b) Write a friend function for adding the two different distances and display its sum, using two classes.</p> <p>c) Design a class Complex for adding the two complex numbers and also show the use of constructor.</p> <p>0. Constructor and method overloading</p> <p>a) Design a class Complex for adding the two complex numbers and also show the use of constructor.</p> <p>b) Design a class Geometry containing the methods area() and volume() and also overload the area() function</p> <p>c) Design a class Static Demo to show the implementation of static variable and static function.</p> <p>1. File handling</p>
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a) Design a class File Demo opens a file in read mode and display the total number of words and lines in the file.

b) Design a class to handle multiple files and file

0. Operator overloading

a) Overload the operator unary (-) for demonstrating operator overloading

b) Overload the operator + for adding the timings of two clocks, And also pass objects as an argument

c) Overload the + for concatenating the two strings. For e.g “c” + “++” = c++

0. Inheritance

a) Design a class for single level inheritance using public and private type derivation.

b) Design a class for multiple inheritances.

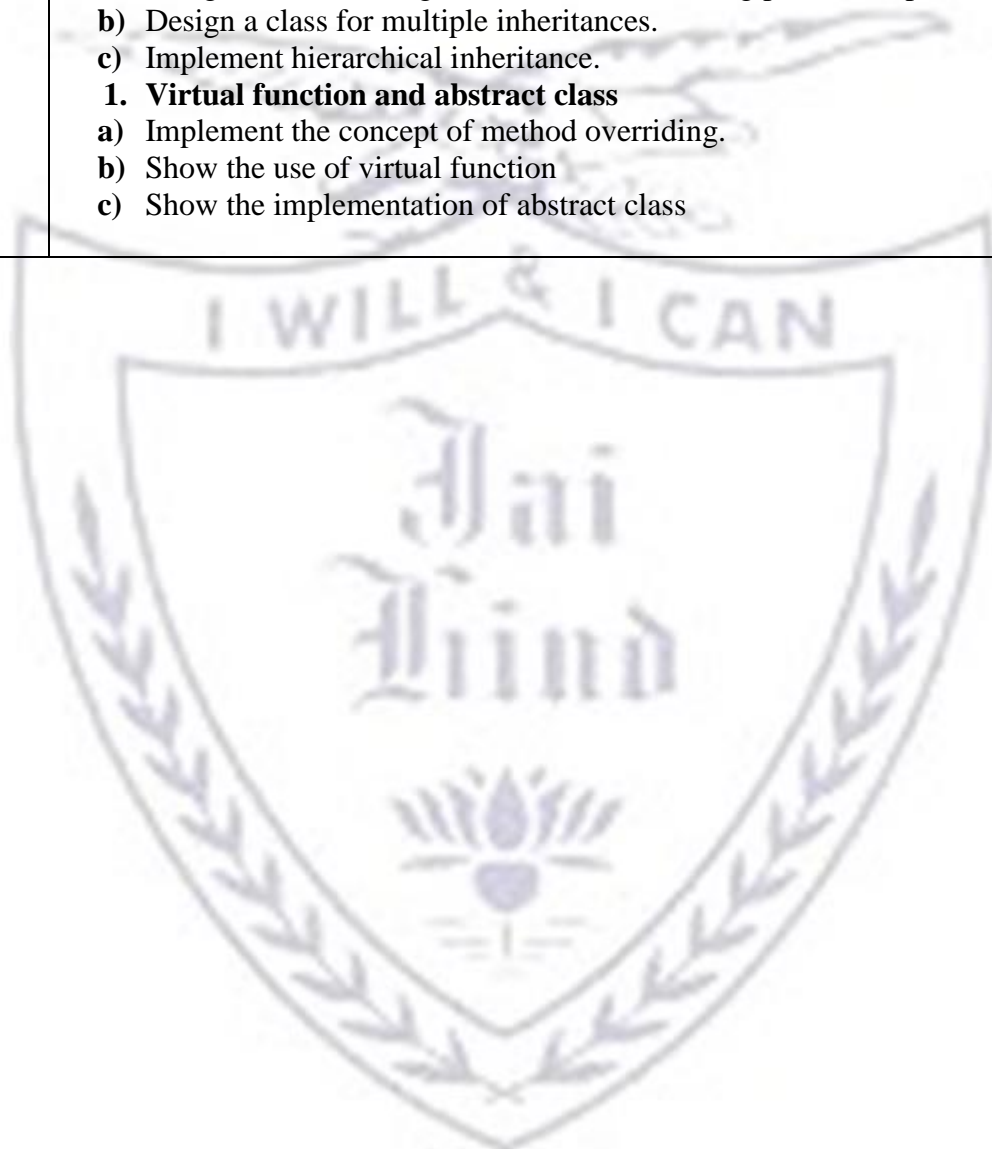
c) Implement hierarchical inheritance.

1. Virtual function and abstract class

a) Implement the concept of method overriding.

b) Show the use of virtual function

c) Show the implementation of abstract class



Skill Enhancement Course

Course Code: JUSVSD-SEC101	Course Title: Modern Operating System (Credits : 02 Lectures/Week: 01)	
	Objectives: <ul style="list-style-type: none"> • To give an overview on the operating system. • To demonstrate process management and system structure. • To discuss the process scheduling and synchronization. • To explain in detail about memory management. Outcomes: <ul style="list-style-type: none"> • Understand different structures and services of the operating system. Also understand the concept of deadlock, memory management and scheduling algorithms. 	
	THEORY	(15 Lectures)
Unit I	Introduction to Operating Systems: OS and Computer System Architecture, OS Operations, Process Management, Memory Management, Storage Management, Protection and security, Batch processing, time-sharing, multiprocessing, real time, distributed and modern operating systems, Desktop Systems, Handheld Systems, Clustered Systems, Operating-System Structures, Operating- System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Virtual Machines, Operating-System Generation, System Boot.	5 L
Unit II	Processes and Process Synchronization: Process Concept, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Operations on Processes, Inter process Communication. Threads: Threads, Multithreading Models, Threading Issues, Thread Scheduling, Communication in Client– Server Systems, The Critical-Section Problem, Peterson’s Solution, Semaphores.	5 L
Unit III	Deadlocks: Deadlocks, Deadlock detection and recovery, avoidance and prevention. Memory Management: Memory management without swapping or paging, Swapping, Virtual Memory, Page replacement algorithms, Modelling paging algorithms, Design issues for paging systems, segmentation.	5 L
Textbooks: <ol style="list-style-type: none"> 1. Andrew S. Tanenbaum, Herbert Bos (2014). Modern Operating Systems: Pearson 2. Abraham Silberschatz, Peter B. Galvineg Gagne. Operating System Concepts: Wiley 		

Course Code: JUSVSD-SEC101	Course Title: Modern Operating System Practical (Practicals/Week:01) <ol style="list-style-type: none"> 1. Installation of virtual machine software 2. Installation of Linux operating system (RedHat / Ubuntu/ Kali linux) on virtual machine. 3. Installation of Windows operating system on virtual machine. 4. (a) pwd, cd, absolute and relative paths, ls, mkdir, rmdir (b)file, touch, rm, cp, mv, rename, head, tail, cat, tac, more, less, strings, chmod 5. (a) ps, top, kill, pkill, bg,fg (b) grep, locate, find,locate. (c) date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis,which. (d) Compression: tar, gzip. 6. (a) Date, time, prompt, md, cd, rd,path. (b) Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del,move. 7. (a) Diskcomp, diskcopy, diskpart, doskey, echo (b) Edit, fc, find, rename, set, type, ver 8. (a) The vieditor (b) Graphics (c) Terminal (d) Adjusting display resolution (e) Using the browsers (f) Configuring simple networking (g) Creating users and shares 9. Write a program for following shell scripts. (a)addition of two numbers using command line arguments. (b) find the factorial of a number. (c)to create functions with parameters. 10. Installing utility software on Linux and Windows
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Indian Knowledge System

Course Code: JUIKS- GEN101	Course Title: Indian Knowledge Traditions (Credits :02 Lectures/Week: 02)	
	<p>Learning Objective:</p> <ol style="list-style-type: none"> 1. To understand and appreciate the importance of ancient Indian knowledge to a society. 2. To introduce the overall organisation of vedic corpus. 3. To understand the nature of contributions made by Indian ancient mathematicians and astronomers. 4. To understand the basic elements of the Indian calendar. 5. To relate the ancient Indian pursuits in the area of metallurgy and idol making. 6. Develop awareness for Indian traditional medicine. <p>Learning Outcome:</p> <ol style="list-style-type: none"> 1. Appreciate the history of the Indian knowledge system. 2. Appraise the importance of Vedas and develop a basic understanding. 3. Recognise the key role played by Aryabhata and others in the field of mathematics. 4. Identify the basics of the celestial coordinate system. 5. Develop familiarity with Science, Engineering and Technology heritage of india. 6. Summarise the contributions of Shrushuta, Charak , Patanjali in the field of ayurvedic medicine. 	
	THEORY	(30 Lectures)
Unit I	<p>Unit I: Introduction to IKS</p> <ul style="list-style-type: none"> ● Definition and significance of IKS, Regional literature and oral traditions ● Classification of literature. Introduction to the 4 Vedas ● Classification of Indian philosophical systems. ● Key characters of purana and their role in food and medicine, geography, astronomy, foetal development, etc . ● Status of Indigenous S & T. 	10 L
UNIT II	<p>Unit II: Mathematics and Astronomy of IKS</p> <ul style="list-style-type: none"> ● Mathematics in Chanda-Sutras ● The Composition Law Bhavana ● The Chakravala Algorithm. ● The celestial coordinate system and spherical geometry. ● The elements of Indian calendar, notion of year, solar and lunar months, notion of thithi, Solar and lunar eclipses calculations. 	5 L

	<ul style="list-style-type: none"> • Planetary models: Comparison with Keplers model, Nilakantha Somayaji’s revision of planetary model, • Aryabhata and Siddhantic tradition, Tithi, Karana, Nakshatra, Yoga, Vara. 	
UNIT III	Unit III : Traditional practices in India <ul style="list-style-type: none"> • Traditional systems of medicine, and overview of AYUSH (Traditional Indian Systems of Medicine). • Contributions of Shrushuta, Charak , Patanjali etc • Ayurveda, Tridoshas and disease management • Mining and ore extraction- medicinal and other applications • Manufacture of Steel • wax casting of idols and artefacts 	5 L

References:

Unit II

1. S. N. Sen and K. S. Shukla, *History of Astronomy in India*, 2nd Ed., INSA, Delhi, 2001.
2. S. Balachandra Rao, *Indian Astronomy An Introduction*, Universities Press, Hyderabad, 2000
3. B. Mahadevan, V. Bhat, *Introduction to Indian Knowledge Systems*, PHI, 2022

Unit III

1. B. Mahadevan, V. Bhat, *Introduction to Indian Knowledge Systems*, PHI Learning Pvt. Ltd, 2022.
2. D.M. Bose, S.N. Sen, B.V. Subbarayappa. *A concise history of Science in India*, Universities Press, Ed. 2, 2009, Hyderabad.

Ability Enhancement Course

Course Code JUSVSD- AEC101	Course Title: English Language Skills (Credits: 02, Lectures/Week: 02)	
Learning	<p>Objectives: It is expected that students:</p> <ul style="list-style-type: none"> ● Enhance their understanding of basic language skills ● Apply basic language skills to different contexts and narratives ● Become equipped to use language skills effectively in creative spheres <p>Outcomes: At the end of the course, students would have:</p> <ul style="list-style-type: none"> ● Understood the basics of grammar and nuances of language ● Illustrated the ability to use the language components accordingly ● Constructed original and creative texts 	
	THEORY	30 Lectures
Sub Unit	Unit – I: Basic Language Skills	10 Lectures
	a. Articles, prepositions, conjunctions b. Types of Sentences (Simple, Compound, Complex) c. Question Tags d. Direct and Indirect Speech e. Active and Passive Voice	
	Unit – II: Applied Language Skills	10 Lectures
	Texts and paragraphs that incorporate the above taken from: - Scientific journals - Literary texts - Newspaper articles - Any other relevant source	
	Unit – III: Creative Writing (to be covered in Tutorials)	10 Lectures
	a) Essays b) Blogs c) Stories d) Dialogues	
	Evaluation Scheme	

	<p>[A] Evaluation scheme for Theory courses -50 Marks</p> <p>I. Continuous Assessment (C.A.) - 25 Marks One or more, MCQ, quiz based, objective type, puzzle, group presentation, case studies, individual projects, debate, model making, poster making, role play</p> <p>II. Semester End Examination (SEE)- 25 Marks</p>	
<p>References:</p>	<ol style="list-style-type: none"> 1. Barker, Alan. (2010). Improve your Communication Skills (Revised Second Edition). New York, Philadelphia and New Delhi: Kogan Press Limited. Print. 2. Bellare, Nirmala. (1998). Reading Strategies. Vols. 1 and 2. New Delhi. Oxford University Press. Print. 3. Blass, Laurie, Kathy Block and Hannah Friesan. (2007). Creating Meaning. Oxford: Oxford University Press. 4. Buscemi, Santi and Charlotte Smith. (1994). 75 Readings Plus. Second Edition New York: McGraw-Hill. Print. 5. Career Skills Library. (2009). Communication Skills (Third Edition). New York: Ferguson Publishing. Print. 6. Doff, Adrian and Christopher Jones. (2004). Language in Use (Intermediate and Upper Intermediate). Cambridge: Cambridge University Press. Print. 7. Glendinning, Eric H. and Beverley Holmstrom. (2004). Second edition. Study Reading: A Course in Reading Skills for Academic Purposes. Cambridge: Cambridge: Cambridge University Press. Print. 8. Greenbaum, Sidney and Gerald Nelson. (2002). An Introduction to English Grammar (Second Edition). London: Longman. Print. 9. Grellet, F. (1981). Developing Reading Skills. Cambridge: Cambridge University Press. Print. 10. Hamp-Lyons, Liz and Ben Heasiey (2006). Second edition. Study Writing: A Course in Writing Skills for Academic Purposes. Cambridge: Cambridge: Cambridge University Press. Print. 11. Hood, J.H. (2013). How to Book of Writing Skills: Improve your English report, email or business. USA: WordCraft Global. Print. 12. Langan, John. (2008). College Writing Skills with Readings (Seventh Edition). New York: McGraw Hill Higher Education. Print. 13. Mohan Krishna & Banerji, Meera (1990). Developing Communication Skills. New Delhi: Macmillan India. Print. 	

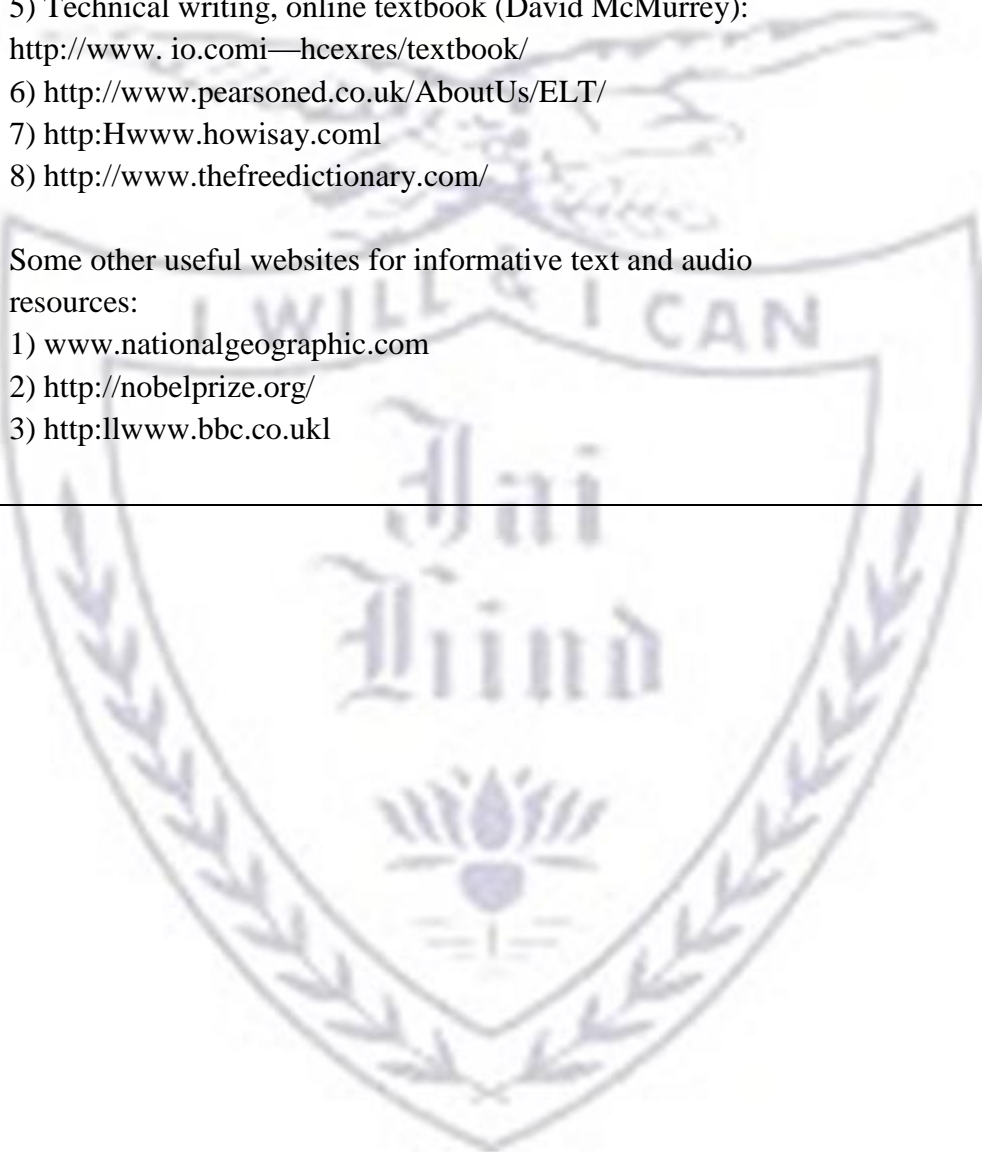
15. Seely, John. (2013). The Oxford Guide to Effective Writing and Speaking: How to communicate clearly (Third Edition). Oxford: Oxford University Press UK. Print.

Websites:

- 1) <http://www.onestopenglish.com>
- 2) www.britishcouncil.org/learning-learn-english.htm
- 3) <http://www.teachingenglish.org.uk>
- 4) <http://www.usingenglish.com/>
- 5) Technical writing, online textbook (David McMurrey):
<http://www.io.comi—hcexres/textbook/>
- 6) <http://www.pearsoned.co.uk/AboutUs/ELT/>
- 7) <http://www.howisay.com/>
- 8) <http://www.thefreedictionary.com/>

Some other useful websites for informative text and audio resources:

- 1) www.nationalgeographic.com
- 2) <http://nobelprize.org/>
- 3) <http://www.bbc.co.uk/>



Value Education Courses

Course Code : JUSVSD- VEC101	Course Title: Digital Literacy (Credits: 2, Lectures/Week: 02)	
Learning	Objectives: <ul style="list-style-type: none"> ● Understand digital world and need for digital literacy ● Create awareness about digital India ● Explore, communicate and collaborate in cyberspace ● Building awareness on cybersafe and security Outcomes: <ul style="list-style-type: none"> ● Demonstrates proficiency using digital tools. ● Uses digital media and environments to communicate effectively. ● Uses digital media and environments to acquire knowledge or skill. ● Learn methods for safe online practices, including how to protect their personal information online. 	
	THEORY	(30 Lectures)
Sub Unit	Unit – I:	10 Lectures
	Computers: History of computer Generation of computer Basic of computers Classification of computers Basic parts of computers computer virus and security Computer applications.	
	Unit – II:	10 Lectures
	Word formatting: Formatting text Formatting paragraph Modify page Layout text to speech Analysis using Excel: Excel Calculation	

	<p>Excel fill handle</p> <p>Excel formula</p> <p>Excel functions</p> <p>importing data</p> <p>presentation of data</p> <p>application of data analysis</p>	
	Unit – III:	10 Lectures
	<p>Presentations:</p> <p>Creating presentation</p> <p>Slide layouts</p> <p>Transitions</p> <p>Use of tome.app, prezi, Canva</p> <p>Environmental values:</p> <p>Benefits of Green Computing</p> <p>Strategies of Green Computing</p> <p>Power management</p> <p>Green computing applications</p>	
References	<ol style="list-style-type: none"> 1. Microsoft Office 2019 Step by Step Book by Curtis Frye and Joan Preppernau 2. Toby Velte, Anthony Velte, Robert Elsenpeter (2008). Green IT: Reduce Your Information System's Environmental Impact McGraw Hill 	

Indian Knowledge System

Course Code: JUIKS-GEN101	Course Title: Indian Knowledge Traditions (Credits: 02, Lectures/Week: 02)	
Learning	Objectives <ul style="list-style-type: none"> ● To understand and appreciate the importance of ancient Indian knowledge to a society. ● To introduce the overall organization of vedic corpus. ● To understand the nature of contributions made by Indian ancient mathematicians and astronomers. ● To understand the basic elements of the Indian calendar. Outcomes: <ul style="list-style-type: none"> ● Appraise the importance of Vedas and develop a basic understanding. ● Recognise the key role played by Aryabhata and others in the field of mathematics. ● Develop familiarity with Science, Engineering and Technology heritage of india. ● Summarize the contributions of Shrushta, Charak , Patanjali in the field of ayurvedic medicine. 	
	THEORY	(Total no.) 30 lectures
Sub Unit	Unit – I:	10 lectures
	Introduction to IKS : Definition and significance of IKS, Regional literature and oral traditions , Classification of literature. Introduction to the 4 Vedas , Classification of Indian philosophical systems. Key characters of purana and their role in food and medicine, geography, astronomy, foetal development, etc . Status of Indigenous S & T.	
	Unit – II:	10 lectures
	Mathematics and Astronomy of IKS : Mathematics in Chanda-Sutras ,The Composition Law Bhavana , The Chakravala Algorithm. The celestial coordinate system and spherical geometry. The elements of Indian calendar, notion of year, solar and lunar months, notion of thithi, Solar and lunar eclipses	

	calculations. Planetary models: Comparison with Keplers model, Nilakantha Somayaji's revision of planetary model, Aryabhata and Siddhantic tradition, Tithi, Karana, Nakshatra, Yoga, Vara.	
	Unit – III:	10 lectures
	Traditional practices in India : Traditional systems of medicine, and overview of AYUSH (Traditional Indian Systems of Medicine). Contributions of Shrushuta, Charak , Patanjali etc Ayurveda, Tridoshas and disease management Mining and ore extraction- medicinal and other applications Manufacture of Steel wax casting of idols and artifacts	
References:	1. S. N. Sen and K. S. Shukla, History of Astronomy in India, 2nd Ed., INSA, Delhi, 2001. 2. S. Balachandra Rao, Indian Astronomy An Introduction, Universities Press, Hyderabad, 2000 3. B. Mahadevan, V. Bhat, Introduction to Indian Knowledge Systems, PHI, 2022 4. B. Mahadevan, V. Bhat, Introduction to Indian Knowledge Systems, PHI Learning Pvt. Ltd, 2022. 5. D.M. Bose, S.N. Sen, B.V. Subbarayappa. A concise history of Science in India, Universities Press, Ed. 2, 2009, Hyderabad.	