



JAI HIND COLLEGE

Basantsing Institute of Science & J. T. Lalvani College of Commerce
and Sheila Gopal Raheja College of Management.

Empowered Autonomous

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

**Affiliated to
University of Mumbai**

Bachelor of Vocational Studies

Program: B. Voc. in Software Development

**Choice Based Credit System (CBCS) under NEP-2020
with effect from the academic year 2023-2024**

Syllabus as approved by Statutory Committees

LOCF Document

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Preamble

The B.Voc. Software Development programme was started in 2015 with an aim to make the students employable and impart industry-oriented training.

In the first year, the basic foundation of important skills required for software development is laid. Second year of this course is about studying core software development subjects. The third year is the further advancement which covers developing capabilities to design formulations of computing models and its applications in diverse areas. In Semester V and Semester VI students have to undertake a Project. It can boost his/her confidence and also can encourage the student to perform innovations in the subject as the choice of the Project topic is kept open covering most of the areas of software development subject as per the students interest and the subject they have learned during the Course.

The Syllabus is designed to align with NASSCOM Qualification Packs for the job roles of Web Developer, Junior Software Developer and Software Developer. Our syllabus is divided into six semesters and is based on the Credit Based Semester and Grading System. Each semester consists of theory and practical papers focusing on different aspects of software development. The theory portion of the paper is composed of three units.

The syllabus is designed based on the projection of sem 5 and sem 6. In sem 5 and 6, we seek to implement the emerging technologies as per current market needs. The technology and structure required for that are subsequently incorporated into the lower semesters. We hold department meetings to discuss the syllabus layout. We consider suggestions from domain specific experts, BOS members and incorporate them in our syllabus.

Each semester comprises a Semester End Examination (SEE) and the question papers for the SEE exams are based on Higher Order Thinking Skills (HOTS). To check the progression of students, we have Continuous Assessment (CA) and it is evaluated based on rubrics. The practicals are of 25 marks of the said course.

The objective of this syllabus is to create a pool of technologically savvy, theoretically and practically strong, innovatively skilled and ethically responsible generation of IT professionals.

Credit Framework

Types of Courses

Sr. No.	Types of Courses	Learner Category
1	Major	B.Voc.SD
2	Minor	B.Voc.SD
3	OE	B.Voc.SD
4	VSC	B.Voc.SD
5	SEC	B.Voc.SD
6	IKS	B.Voc.SD
7	VEC	B.Voc.SD
8	AEC	B.Voc.SD
9	OJT/FP/ RP/ CEP/CC	B.Voc.SD

Number of Courses and Credits

Types of Courses	Number offered of each	Credits of each (Theory + Practical)
Major	2	4(3+1)
Minor	2	4(3+1)
OE	4	(2+2) (Theory)
VSC	2	2 (Practical)
SEC	2	2 (Practical)
IKS	1	2 (Theory)
VEC	2	2 (Theory)
AEC	2	2 (Theory)
OJT/FP/ RP/ CEP/CC	1	2 (Practical)

Semester-wise Courses

SEMESTER	Course Code	Course Name	type	Credits
I	JUSVSD-DSC101	Basics of Web Designing	Major	3
I	JUSVSD-DSCPR101	Basics of Web Designing Practical	Major	1
I	JUSVSD-MIN101	Logics & Algorithms	Minor	3
I	JUSVSD-MINPR101	Logics & Algorithms Practical	Minor	1
I	JUSVSD-OE101	Financial Literacy	OE	2
I	JUSVSD-OE102	Logic, Reasoning and Aptitude	OE	2
I	JUSVSD-VSC101	Introduction to Programming with C++	VSC	2
I	JUSVSD-SEC101	Modern Operating System	SEC	2
I	JU-IKS-GEN101	Indian Knowledge System	IKS	2
I	JUSVSD-VEC101	Digital Literacy	VEC	2
I	JUSVSD-AEC101	English Language Skills	AEC	2
II	JUSVSD-DSC201	Advanced Web Designing	Major	3
II	JUSVSD-DSCPR201	Advanced Web Designing Practical	Major	1
II	JUSVSD-MIN201	Computational Mathematics	Minor	3
II	JUSVSD-MINPR201	Computational Mathematics Practical	Minor	1
II	JUSVSD-OE201	Strategic Management	OE	2
II	JUSVSD-OE202	Digital Marketing	OE	2
II	JUSVSD-VSC201	Introduction to Database	VSC	2
II	JUSVSD-SEC201	Java Programming	SEC	2
II	JUSVSD-VEC201	Digital Empowerment	VEC	2
II	JUSVSD-AEC201	English Communication Skills	AEC	2
II		OJT/FP/ RP/ CEP	OJT/FP/ RP/ CEP	2

Learning Outcome-based Approach

The National Higher Education Qualifications Framework (NHEQF) envisages that students must possess the quality and characteristics of the graduate of a programme of study, including learning outcomes relating to the disciplinary area in the chosen field of learning and generic learning outcomes that are expected to be acquired by a graduate on completion of the programme of study.

Learning outcomes are important for recognition. It is important to emphasize on it since the important question asked to the student is-What you can do now that you are a graduate in Economics? The prior specification of the intended educational outcomes helps in maximizing educational effectiveness. All the educational activities from designing curriculum, to teaching pedagogies, to methods of evaluation are directed maximally towards the attainment of specific desired goals. The student's learning outcomes refer to the attainment of the particular competencies acquired by the student on completion of the undergraduate Economics program.

Graduate Attributes

- **Deep discipline knowledge and intellectual breadth**

Graduates have comprehensive knowledge and understanding of their subject area, the ability to engage with different traditions of thought, and the ability to apply their knowledge in practice including in multi-disciplinary or multi-professional contexts.

- **Creative, critical thinking, scientific reasoning and problem solving**

Graduates are effective problems-solvers, able to apply critical, creative and evidence-based thinking to conceive innovative responses to future challenges.

- **Teamwork and communication skills**

Graduates convey ideas and information effectively to a range of audiences for a variety of purposes and contribute in a positive and collaborative manner to achieving common goals.

- **Professionalism and leadership readiness**

Graduates engage in professional behavior and have the potential to be entrepreneurial and take leadership roles in their chosen occupations or careers and communities.

- **Independent and lifelong learning**

A capacity to be a self-directed learner and thinker and to study and work independently. Resulting in continuous learning, resilience, confidence, learning transferable and time management skills and an ability to learn independently

- **Research skills**

They are able to identify a problem, collect informational resources that can help address the problem, evaluate these resources for quality and relevance and come up with an effective solution to the problem

Programme Objectives

1. They are able to develop an understanding of current technologies and adapt according to the changing technology.
2. They are able to dissect problems into algorithmic solutions by applying appropriate software methodologies.
3. They are able to develop an understanding of data and focus on the analysis of it to produce proactive security measures.
4. They are able to develop technological research aptitude and understand research methodologies.
5. They are able to have clearer insight to intensify and apply solution-based systems and processes that address issues and improve existing systems within a computing-based industry.
6. They are skillful to show active participation in project-based coursework, case studies, simulations and presentations and have business knowledge.
7. To impart the correct practices of the strategies of Effective Business writing.
8. To guide the students in developing skills and job-search strategies required to achieve their career objectives.
9. Understand a wide variety of learning algorithms. Also to develop capabilities to design and develop formulations for computing models and identify its applications in diverse areas. Understand how to evaluate models generated from data. Apply the algorithms to a real problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Teaching Learning Process

1. Lectures

Lectures should be designed to provide the learners with interesting and fresh perspectives on the subject matter. Lectures should be interactive in a way that students work with their teachers to get new insights in the subject area, on which they can build their own bridges to higher learning.

2. Discussions

Discussions are critical components of learning, and can be used as a platform for students to be creative and critical with old and new ideas.

3. Experiential learning

Experiential learning is an engaged learning process whereby students “learn by doing” and by reflecting on the experience and enhancing their technical skills through mini projects.

4. Case Studies:

Case studies, wherever possible, should be encouraged in order to challenge students to find creative solutions of complex problems and various aspects of the knowledge domain concerned.

5. Team Work

Positive collaboration in the form of teamwork is essential for achieving the intended goals within given deadlines. In the process of teamwork, learners will acquire the skills of managing knowledge, acquisition, critical thinking and other collaborative learners, thereby understanding how to incorporate and balance personalities.

6. Excursion trip:

Excursion trips provide opportunities to the learners to test their in-class learning in real-life situations as well as to understand the functional diversity in the learning spaces.

7. Academics-Industries Interface:

The course encourages students for closer interaction with Industries/corporate/research institutes, etc. for the internship and training program.

8. Blended learning

Combine online educational materials and opportunities for interaction online with traditional place-based classroom methods. Use of digital learning tools with more traditional classroom face to face teaching.

9. Flipped Learning/Flipped Classroom Learning

Improve the student performance and learning experience effectively by making students watch online lectures, collaborate in online discussions, or carry out research at home and engage in concepts in the classroom which provides a reason for learning content.

10. Research based learning :

The primary purpose of educational research is to expand the existing body of knowledge by providing solutions to different problems in pedagogy while improving teaching and learning practices. Educational researchers also seek answers to questions bothering on learner-motivation and development.

Assessment Methods / Evaluation Scheme

The assessment of students' achievement in BSc. IT will be aligned with course/program learning outcomes and the academic and technical skills that the program is designed to be developed. A variety of assessment methods that are relevant within the disciplinary area of Information Technology will be used.

Learning outcomes will be assessed through Students' performance in courses in various ways viz.,

- The oral and written scheduled or weekly tests
- Problem-solving exercises
- Closed-book and open-book tests
- Observing practical skills, practical assignments and documentation
- Individual and group project reports
- Seminar presentations
- Group discussions
- Viva voce examinations
- Digital learning tools
- Literature surveys and evaluations, peers and self-assessment can be the additional methods used.
- Communicating (One and two-way communication; communication within a group, verbal, written and non-verbal communication. Arguing, describing, advocating, interviewing, negotiating, presenting; using specific written forms) by written presentation (essay, report, reflective paper etc.), oral presentation, group work and discussion/debate/role play.
- Regular reading habits in the students need to be inculcated through continuous monitoring and observation about weaker aspects of the Students through peer mentoring.

Discipline Specific Core Courses – Major

Course Code : JUSVSD- DSC101	Course Title: Basics of Web Designing	Credits: 03 Lectures/Week:3
Course Description	The purpose of this course is to incorporate the skills required for web development by introducing learners with web technologies to help them understand the building blocks of web development.	
Learning objectives	<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. 	
Course Outcomes	<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. • Implementing CSS to design attractive websites. • Use JavaScript and jQuery for adding effects and dynamic behaviour to web pages. 	
	THEORY	45 Lectures
Sub Unit	Unit – I:	15 Lectures
1.	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	
2.	CSS: Basics of CSS, Introduction to CSS, CSS Syntax, CSS Sectors, CSS Colors, CSS Background, Fonts and Text with CSS, CSS links, Lists and Tables.	
	Unit – II:	15 Lectures

1.	CSS Box Model: CSS Dimension, Padding, Border and Margin.	
2.	Advanced CSS: CSS Position, Float and Align; CSS Opacity, CSS Navigation Bar, Dropdowns, Image Gallery; CSS Counters.	
3.	JavaScript: Basics of JavaScript: Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, Syntax, Operators, Conditional and Looping Statements, Function	
	Unit – III:	15 Lectures
1.	JavaScript Objects: Object, Number, String, Boolean, Array, Date, Math.	
2.	Advanced: Document Object Model, Events and Event Handling, Form Validation.	
3.	jQuery: Introduction: Syntax, Selectors, Events	
4	jQuery Effects: Hide/Show, Fade, Slide, Animate, Stop(), Callback, Chaining	
5	jQuery HTML: Get, Set, Add, Remove, CSS Classes, css(), Dimensions Traversing: Ancestors, Descendants, Siblings, Filtering	
	Evaluation Scheme [A] Evaluation scheme for Theory courses 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 II. Semester End Examination (SEE)- 50 Marks	
References:	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.
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BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	10	05	05	20
II	04	05	06	15
III	05	04	06	15
TOTAL MARKS PER OBJECTIVE	19	14	17	50
% WEIGHTAGE	38	28	34	100

Course Code: JUSVSD- DSCPR101	Practical Title: Basics of Web Designing Practical (Credits : 01 Practicals/Week: 02 hrs)
	<ol style="list-style-type: none"> 1. Implement the following in HTML: <ol 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. 2. Implement the following in CSS: <ol 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.

	<p>c. Design a webpage using HTML forms that uses all types of control and style it with CSS.</p> <p>d. Design a webpage using CSS and display Horizontal and Vertical Navigation bar.</p> <p>3. Implement the following in XML:</p> <p>a. Design a XML document and display it in the browser using CSS.</p> <p>b. Design an XML document and display it in the browser using XSL.</p> <p>c. Design XML Schema and corresponding XML document.</p> <p>4. Implement the following in JavaScript:</p> <p>a. Write a javascript program which displays the working of operators.</p> <p>b. Write a javascript program which displays the working of control statements.</p> <p>c. Write a javascript program which displays the working of events and event handlers.</p> <p>5. Implement the following in jQuery:</p> <p>a. Write a program for Selectors.</p> <p>b. Write a program for Event Methods.</p>
	<p>Evaluation Scheme</p> <p>[A] Evaluation scheme for Practical courses– 25 marks i.e. (50/2 marks)</p> <p>(i) Internal practical continuous assessment (CA) -20 marks</p> <p>(ii) SEE Practical -25 marks</p> <p>(iii) Viva- 05 marks</p>

Course Code : JUSVSD- DSC201	Course Title: Advanced Web Designing	Credits: 03 Lectures/Week: 3
Course Description	The purpose of this course is to incorporate the advance skills required for web development by introducing learners with new web technologies.	
Learning objectives	<ul style="list-style-type: none"> • Understanding emerging web technologies • Learn the basics of creating XML documents, transforming XML documents, and validating XML documents • Articulate what React is and why it is useful • Understand creating large web applications 	
Course Outcomes	<ul style="list-style-type: none"> • Understand how the client-server model of Internet programming works. • Design and develop interactive, client-side, executable web applications. • Build tools that assist in automating data transfer over the Internet. • Enhancing Front-end development skills. 	
	THEORY	45 Lectures
Sub Unit	Unit – I:	15
1.	Introducing XML: The Benefits of XML, How XML Works. XML Fundamentals Contents: XML Documents and XML Files Elements, Tags, and Character Data Attributes, XML Names Entity References, CDATA Sections Comments Processing Instructions, The XML Declaration Checking Documents for Well-Formedness.	
2.	React: Introduction,What is React ,What is single page application(SPA), How React Works & Understanding Components ,React Class,More About Components & Styling with CSS Classes ,Handling Events ,Introducing State,Event Props,Stateless and Stateful Components,Adding Routing,Adding Links & Navigation,CSS Modules	
	Unit – II:	15

1.	Introduction of Laravel PHP Framework: Laravel Directory Structure, Configuring a new Laravel project, Basic routing, Call a controller method from a route, Passing variables from controllers to views	
2.	HTML Template to Laravel Blade Template: Template inheritance Blade conditional statements, Blade Loops, Executing PHP functions in blade	
	Unit – III:	15
1.	Laravel: Displaying Your Views, Creating and using basic views, Loading a view into another view/nested views, Adding assets, Integrating with Bootstrap, Creating contact us form, Validating user input.	
2	Flask : Installation, Basic application structure, Templates, webforms, Databases	
	Evaluation Scheme [A] Evaluation scheme for Theory courses 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 II. Semester End Examination (SEE)- 50 Marks	
References	1. XML in a Nutshell, 3rd Edition, Elliotte Rusty Harold, W. Scott Means, O'Reilly Media, Inc. 2. “React in Action”-by Mark Tielens Thomas, Manning publications 3. Laravel_ Up & Running_ A Framework for Building Modern PHP Apps, 2nd Edition, Matt Stauffer, O'Reilly. 4. Introduction to Flask by Miguel Grinberg	

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UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	10	04	06	20
II	05	04	06	15
III	04	06	05	15
TOTAL MARKS PER OBJECTIVE	19	14	17	50
% WEIGHTAGE	38	28	34	100

Course Code: JUSVSD- DSCPR201	Practical Title: Advanced Web Designing Practical (Credits : 01 Practicals/Week: 02 hrs)
	<ol style="list-style-type: none">1. XML:<ol style="list-style-type: none">a. Design a simple XML documentb. Design a XML document and display it in the browser using CSS.2. React:<ol style="list-style-type: none">a. Creating an application using react. (Component,State and Props)b. Demonstrating React JSX, React Router.3. Laravel:<ol style="list-style-type: none">a. Installing Laravel and also understands the directory structure.b. Create an application to perform routing with different routing methods and also pass parameters as a route parameter.c. Create a form to implement Blade template.d. Create a laravel application and connect it with mysql database to perform insert, update, search and delete operations.

	<p>4. Flask:</p> <ul style="list-style-type: none">a. Create Flask Applicationb. Show the use of cookies and sessionsc. Connect Flask to a Database with Flask-SQLAlchemy
	<p>Evaluation Scheme</p> <p>[A] Evaluation scheme for Practical courses– 25 marks i.e. (50/2 marks)</p> <ul style="list-style-type: none">(i) Internal practical continuous assessment (CA) -20 marks(ii) SEE Practical -25 marks(iii) Viva- 05 marks

Discipline Specific Core Courses – Minor

Course Code JUSVSD-MIN101	Course Title: Logics and Algorithms	Credits: 03 Lectures/Week:03
Course description	This course introduces mathematical logic from the perspective of computer science, emphasizing decidable fragments of logic and decision procedures.	
Learning 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. • Apply logical reasoning to solve a variety of problems. 	
Course Outcomes	<ul style="list-style-type: none"> • To think analytically, creatively and critically in developing robust, extensible • Highly maintainable technological solutions to simple and complex problems. 	
	THEORY	(45 lectures)
Sub Unit	Unit – I	15 lectures
1.	Number System: Decimal, Binary, Octal, Hexadecimal, number system conversion, arithmetic operations.	
2.	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.	
3.	The Logic of Compound Statements Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments	
4.	Quantified Statements Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements	
	Unit – II	15 lectures
1.	Relations, digraphs and lattices Product sets and partitions, relations and digraphs, paths in relations and digraphs, properties of relations, equivalence and partially ordered relations, computer representation of relations and digraphs, manipulation of relations, Transitive closure and Warshall's algorithm, Posets and Hasse Diagrams, Lattice.	

2.	Functions Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Cardinality with Applications to Computability	
	Unit – III	15 lectures
1.	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.	
2.	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.	
	Evaluation Scheme [A] Evaluation scheme for Theory courses 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 II. Semester End Examination (SEE)- 50 Marks	
References:	1. Discrete Mathematics with Applications Susanna S. Epp Cengage Learning 4th 2010. 2. Discrete Mathematics, Schaum's Outlines Series Seymour Lipschutz, Marc Lipson Tata MCGraw Hill 2007	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS

I	5	5	10	20
II	5	5	5	15
III	5	5	5	15
TOTAL MARKS PER OBJECTIVE	15	15	20	50
% WEIGHTAGE	30	30	40	100

Course Code: JUSVSD-MINPR101	Course Title: Logics & Algorithms Practical (Credits :01 Practicals/Week: 02 hrs)
	<ol style="list-style-type: none"> 1. Set Theory <ol style="list-style-type: none"> a. Inclusion Exclusion principle. b. Power Sets. c. Mathematical Induction. 2. Functions and Algorithms <ol style="list-style-type: none"> a. Recursively defined functions b. Cardinality c. Polynomial evaluation d. Greatest Common Divisor 3. Boolean Algebra <ol style="list-style-type: none"> a. Basic definitions in Boolean Algebra 4. Properties of integers <ol style="list-style-type: none"> a. Division algorithm b. Primes c. Euclidean algorithm d. Fundamental theorem of arithmetic e. Congruence relation f. Linear congruence equation 5. Algebraic Systems <ol style="list-style-type: none"> a. Properties of operations

	<ul style="list-style-type: none"> b. Roots of polynomials 6. Recurrence relations <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> a. Paths and connectivity b. Minimum spanning tree c. Isomorphism 8. Directed Graphs <ul style="list-style-type: none"> a. Adjacency matrix b. Path matrix 9. Counting <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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
	<p>[A] Evaluation scheme for Practical courses– 25 marks i.e. (50/2 marks)</p> <ul style="list-style-type: none"> (i) Internal practical continuous assessment (CA) -20 marks (ii) SEE Practical -25 marks (iii) Viva- 05 marks

Course Code JUSVSD- MIN201	Course Title: Computational Mathematics	Credits: 03 Lectures/Week: 03
Course description	It is a study of the intersection of mathematics, statistics, optimization, and computer science, to solve problems in business, finance, medicine, science, and technology. It helps to learn to analyze data sets, formulae, and images in ways that help us understand the world around us and predict and influence the future.	
Learning objectives	<ul style="list-style-type: none"> • It will develop problem-solving skill • It will develop critical thinking skills and use these skills to solve complex computing problems 	
Course Outcomes	<ul style="list-style-type: none"> • Understand strategies for effective design and their application in designing computing systems • Develop inductive and deductive skills in reasoning • Formulate and solve abstract mathematical problems • Gain experience in mathematical modelling of real-world phenomena using approximation and hypothesis testing and linear programming. 	
	THEORY	(45 lectures)
Sub Unit	Unit – I	15 lectures
1.	The Mean, Median, Mode, and Other Measures of Central Tendency Histogram, types of data ,The Arithmetic Mean , The Weighted Arithmetic Mean ,Properties of the Arithmetic Mean ,The Arithmetic Mean Computed from Grouped Data ,The Median ,The Mode, The Empirical Relation Between the Mean, Median, and Mode, The Geometric Mean G, The Harmonic Mean H ,The Relation Between the Arithmetic, Geometric, and Harmonic Means, The Root Mean Square, Quartiles, Deciles, and Percentiles.	
	Unit – II	15 lectures
1.	Random Variable and Distribution Function discrete and continuous distributions, Moments and Moment Generating Functions; Binomial Distribution; Poisson Distribution; Negative Binomial Distribution; Geometric Distribution; properties	
2.	Statistical Decision Theory	

	Statistical Decisions, Statistical Hypotheses, Tests of Hypotheses and Significance, or Decision Rules, Type I and Type II Errors, Level of Significance, Tests Involving Normal Distributions, Two-Tailed and One-Tailed Tests, Special Tests, Operating-Characteristic Curves; the Power of a Test, pValues for Hypotheses Tests, Control Charts, Tests Involving Sample Diff Tests Involving Binomial Distributions.	
3.	Small Sampling Theory Small Samples, Student's t Distribution, Confidence Intervals, Tests of Hypotheses and Significance, The Chi-Square Distribution, Confidence Intervals for Sigma, Degrees of Freedom.	
	Unit – III	15 lectures
1.	Curve Fitting and the Method of Least Squares Relationship Between Variables, Curve Fitting, Equations of Approximating Curves, Freehand Method of Curve Fitting, The Straight Line, The Method of Least Squares, The Least-Squares Line, Nonlinear Relationships, The Least-Squares Parabola, Regression, Applications to Time Series.	
2.	Linear Programming Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution.	
	Evaluation Scheme [A] Evaluation scheme for Theory courses 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 II. Semester End Examination (SEE)- 50 Marks	
References:	1. "Fundamentals of Mathematical Statistics" by S. C. Gupta, V. K.Kapoor 2. "Introductory Methods of Numerical Methods" by S. S. Shastri , Vol.2 3. "Elements of Applied Mathematics" by P.N.Wartikar and J.N.Wartikar	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	5	5	05	15
II	5	5	10	20
III	5	5	5	15
TOTAL MARKS PER OBJECTIVE	15	15	20	50
% WEIGHTAGE	30	30	40	100

Course Code: JUSVSD- MINPR201	Practical Title: Computational Mathematics Practical (Credits: 01 Practicals/Week: 02 hrs)
	<ol style="list-style-type: none"> 1. Introduction of R 2. Using R execute the basic commands, array, list and frames. 3. Create a Matrix using R and Perform the operations addition, inverse, transpose and multiplication operations. 4. Draw histogram using R 5. Measures Using R Execute the statistical functions: mean, median, mode, quartiles, range, inter quartile range 6. Perform Binomial Distribution; 7. Perform Poisson Distribution; 8. Perform Negative Binomial Distribution; 9. Perform Geometric Distribution 10. Import the data from Excel / .CSV and perform the hypothetical testing. 11. Perform the Linear Regression using R.
	<p>Evaluation Scheme:</p> <p>[A] Evaluation scheme for Practical courses– 25 marks i.e. (50/2 marks)</p> <p>(i) Internal practical continuous assessment (CA) -20 marks</p> <p>(ii) SEE Practical -25 marks</p> <p>(iii) Viva- 05 marks</p>

Open Elective

Course Code: JUSVSD- OE101	Course Title: Financial Literacy	Credits: 02 Lectures/Week: 02
Course description	The course covers the basics concept of financial literacy and budgeting ; savings and investing and financial planning and personal tax planning.	
Learning 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 	
Course 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 	

	<ul style="list-style-type: none"> Learn basics of investment and tax planning 	
	THEORY	(30 lectures)
Sub Unit	Unit – I:	10 lectures
1.	Financial Literacy a) Five pillars of financial literacy – save, invest, budget, manage debt and tax planning b) Benefits of financial literacy	
2.	Budgeting a) Income & expenses b) Setting priorities: difference between needs and wants c) Budgeting	
	Unit – II:	10 lectures
1.	Saving a) Benefits of saving and financial discipline b) Methods of saving	
2.	Investment a) Concept of time value of money and its importance b) Choosing between financial products to invest: Rate of return vs risk	
	Unit – III:	10 lectures
1.	Financial goals a) Importance of financial goals b) Steps to set financial goals	
2.	Personal tax planning a) Tax structure in India b) Need and importance of tax planning	
	Evaluation Scheme [A] Evaluation scheme for Theory courses -50 Marks I. Continuous Assessment (C.A.) - 25 Marks	

	<p>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>	
References:	<p>References:</p> <p>1. Singh, Abhishek Kumar and Rajni (2022), Financial Literacy, 1st edition, JSR Publishing House LLP, India</p> <p>2. Sinha, Madhu (2017), Financial Planning: A Ready Reckoner, McGraw Hill, USA</p> <p>Suggested Readings:</p> <p>3. The Richest Man in Babylon by George S. Clason</p> <p>4. The Intelligent Investor by Benjamin Graham</p>	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	03	03	03	9
II	03	02	03	8
III	02	03	03	8
TOTAL MARKS PER OBJECTIVE	08	08	09	25
% WEIGHTAGE	32	32	36	100

Course Code JUSVSD- OE102	Course Title: Logic, Reasoning and Aptitude	Credits: 02 Lectures/Week:02
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Course description	Logical, Reasoning skills help students in improving their decision-making skills, problem-solving skills, and setting goals. These personal skills are necessary for building a stable career foundation in the IT industry.	
Learning 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 	
Course 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)
Sub Unit	Unit – I	10 Lectures
	Picture Reasoning Verbal Reasoning Syllogism Input Output Critical Reasoning Statement Reasoning	
	Unit – II:	10 Lectures
	Tabular Graph Line Graph Pie Chart Bar Diagram Data Sufficiency Permutation and Combination	
	Unit – III:	10 Lectures
	Analytical Problems Relation Problem Arrangements Questions	

	Decision Making Problems Comprehension of Technical Writing	
	<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>	
References:	Textbook: 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: 2. Meah, M. (2011) Competency Questions Made Easy,Sapere Media. 3. Povah, N. &Povah, L.,(UK edn) (2009). Succeeding at Assessment Centres for Dummies, John Wiley & Sons.	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	02	05	00	07
II	04	04	02	10
III	02	05	01	08
TOTAL MARKS PER OBJECTIVE	08	14	03	25

% WEIGHTAGE	32	56	12	100
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Course Code: JUSVSD- OE201	Course Title: Strategic Management	Credits: 2 Lectures/Week: 2
Course description	This course aims to build in students an understanding in how managers employ the formal and informal relationships that exist between firms in an industry.	
Learning objectives	<ul style="list-style-type: none"> • Devise solutions to the externally focused questions facing a company, and effectively formulate and implement an organization's key strategies to achieve key result areas. • It will enable students to learn various levels of corporate strategies and provoke their critical thinking skills. • It will help students to understand the business problems and ways to find solutions, by undertaking strategic management case studies and assignments. 	
Course Outcomes	<ul style="list-style-type: none"> • Develop critical thinking approach by understanding concepts in Strategic Management • Get to understand strategy formulation, implementation, monitoring and evaluation • Build up problem solving skills and understand brand building through use of strategic decisions • Develop capabilities of the students to analyze industry projects/cases and develop strategic solutions 	
	THEORY	30 Lectures
Sub Unit	Unit – I:	10 Lectures
1.	Introduction to Strategic Management: Strategic Thinking, Strategic Management, Strategic Planning(Concepts and Scope), Characteristics of Strategic Decision Vision, Mission, Objectives, Goals and Strategy: Mutual Relationships, Approaches to Strategic Decision Making The Strategic Management Process Strategic Management -Merits and demerits.	
	Unit – II:	10 Lectures
1.	Environment Scanning and Analysis : Need for Environmental Scanning and Analysis ,External and	

	Internal Environment of the Firm, Recognizing a Firm's Intellectual Assets, SWOT Analysis TOWS Matrix, Kirin Beer: Case Study, SWOT Analysis, Ben and Jerry's Ice Cream: Case Study.	
	Unit – III:	10 Lectures
1.	Strategic Formulation and Management Models : Levels of Strategies, Samsung: Case Study , Foxconn Strategy, Models-BCG Model, GE 9 Cell, Porters Model: 5 Force and Porters Diamond Model, StrategyChoice and implementation ,Cultural aspect of Strategic Choice, Functional Strategy.	
2.	Strategy Implementation, Ethics and Change Management : Project implementation, Control Procedures, Resource allocation, Corporate Ethos, Culture and Ethics, Management of Change, Organizational Creativity and Innovation Process.	
	Evaluation Scheme Evaluation scheme for Theory courses -50 Marks 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 II. Semester End Examination (SEE)- 25 Marks	
References:	<ol style="list-style-type: none"> 1. Fred R. David, (13th Ed). Strategic Management: Concepts & Cases. New Jersey: PrenticeHall International. 2. Dr. Kazmi, Azhar.(2008) Business Policy & Strategic Management. Mumbai :Tata McGrawHill. 3. Pearce II, John A & Robinson Jr, Richard B. (2015). Strategic Management. Delhi: A.I.T.B.S.Publishers. 4. Upendra Kachru. (2005). Strategic Management Concepts and Cases. New Delhi: Excel Publications. 5. Ansoff H. Igor. (1992). Implanting Strategic Management, Englewood Cliffs. New Jersey, Prentice Hall of India. 	

	<p>6. Glueck, William F. (1988). Strategic Management and Business Policy, New York McGraw Hill.</p> <p>7. Thomson & Strickland. (2001). Strategic Management Concept and Cases – Tata McGrawHill</p>
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BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	5	5	0	10
II	3	2	3	8
III	2	2	3	7
TOTAL MARKS PER OBJECTIVE	10	9	6	25
% WEIGHTAGE	40	36	24	100

Course Code: JUSVSD- OE202	Course Title: Digital Marketing	Credits: 2 Lectures/Week: 2
Course description	This course will teach students about the importance and concepts of digital marketing.	
Learning objectives	<ul style="list-style-type: none"> • Understand the Digital Marketing tools and techniques to optimize searches, market content on social media and various strategies • It will teach students how to market their products (tour package or a software program) • Learning SEO and online business promotion tools are often in demand skills and students will be equipped for the industry 	
Course Outcomes	<ul style="list-style-type: none"> • Able to understand Search Engine Optimization, Marketing on Social Media, Affiliate marketing.. • Key trends in Digital marketing -Email marketing • Impact of Digital resources in marketing. • To assess the influence on search behavior. 	
	THEORY	30 Lectures
Sub Unit	Unit – I:	15 Lectures
1.	Digital Marketing Concept and Scope: Competitor and Website, Analysis Online Buying behavior, Target Audience analysis, List of Free and Premium Digital Marketing Tools.	
2.	Search Engine Optimization (SEO): Rank Webpage on top of search, ORM, Google Webmaster Tool, Google Analytics, Paid Ads Optimization Strategies.	
3.	Pay-per-click advertising (PPC): Google Ads Campaign Management, Optimization, and Reporting	
4.	Content marketing:	

	Designing Content, Choosing Digital Marketing Channels, Blogs, Infographics or Video as per the Target Audience.	
	Unit – II:	10 Lectures
1.	Social Media Platforms to serve Ads, Social Networking (Facebook, LinkedIn, etc.) Facebook Marketing Tools, Microblogging (Twitter, Tumblr), Photo sharing (Instagram, Snapchat, Pinterest), Video sharing (YouTube, Facebook Live, Instagram, etc.).	
	Unit – III:	10 Lectures
1.	Affiliate marketing: Concept, Referrals can mention your website and backlink it to your own businesses, ,Email marketing: - Cost saving tool, advantages and disadvantages, Display advertising blogs, networks, video ads, contextual data, ads on the search engines, classified or dynamic advertisement ,Manage your Online Reputation	
	Evaluation Scheme Evaluation scheme for Theory courses -50 Marks 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 II. Semester End Examination (SEE)- 25 Marks	
References:	1. Koontz, O'Donnell &Wehrich, (1980) Management, Tokyo: McGrawHill Inc 2. Robbins (16th ed) (1979). Organizational Behavior, New Delhi: Prentice-Hall of India. 3. Singh, D. (2001). Emotional Intelligence at work, Response Books, New Delhi: Sage Publication	

	<p>4. Sissors, Jack Z., Surmanek, Jim. (1976). Advertising Media Planning: Crain books.</p> <p>5. James R Adams. (1977). Media Planning: Business books.</p> <p>6. D, Nidhi. (ed 2011). E-Commerce Concepts and Applications, Mumbai: International Book House Pvt Ltd.</p> <p>7. Whiteley, David. (2013). E-Commerce Technologies and Applications, London: McGraw Hill.</p>
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BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	2	2	0	4
II	3	1	2	6
III	3	2	3	8
IV	3	1	3	7
TOTAL MARKS PER OBJECTIVE	11	6	8	25
% WEIGHTAGE	44	24	32	100

Skill Enhancement Elective Courses

Course Code JUSVSD-SEC101	Course Title: Modern Operating System	Credits: 02 Lectures/Week: 01
Course description	This course aims to make students aware of different concepts and components related to operating systems.	
Learning 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. 	
Course Outcomes	<ul style="list-style-type: none"> • Understand different structures and services of the operating system. • Understand the concept of deadlock, memory management and scheduling algorithms • Descriptive objectives of each Foundation of design, concepts and structure • Understanding computing and resource management of the computer organization and operating systems 	
	THEORY	(15 lectures)
Sub Unit	Unit – I:	5 lectures
	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, OperatingSystem 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.	
	Unit – II:	5 Lectures
	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 CriticalSection Problem, Peterson’s Solution, Semaphores.	
	Unit – III:	5 Lectures
	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.	
	[A] Evaluation scheme courses– 50 marks (i) Continuous assessment (CA) -25 marks (ii) SEE Practical -25 marks	
References:	1. Andrew S. Tanenbaum, Herbert Bos (2014). Modern Operating Systems: Pearson 2. Abraham Silberschatz, Peter B. Galvining Gagne. Operating System Concepts: Wiley	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDG E	UNDERSTANDIN G	APPLICATIO N	TOTAL MARK S
I	04	02	02	08
II	03	03	03	09
III	04	02	02	08

TOTAL MARKS PER OBJECTIVE	11	07	07	25
% WEIGHTAGE	44	28	28	100
Course Code: JUSVSD-SEC101	Course Title: Modern Operating System Practical (Practicals/Week: 02 hrs)			
	<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. <ol style="list-style-type: none"> 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 			

Course Code: JUSVSD- SEC201	Course Title: Java Programming	Credits: 02 Lectures/Week: 01
Course description	The course aims to cover extensive knowledge of java programming.	
Learning objectives	<ul style="list-style-type: none"> • Designs will demonstrate the use of good object-oriented design principles including encapsulation and information hiding. • The implementation will demonstrate the use of a variety of basic control structures including selection and repetition; classes and objects in a tiered architecture (user interface, controller, and application logic layers); primitive and reference data types including composition; basic Swing components; file-based I/O; and one- dimensional arrays. 	
Course Outcomes	<ul style="list-style-type: none"> • Create Java programs that solve simple business problems. • Construct a Java class based on a UML class diagram. • Knowledge and implementation of Swing components • Implementation of accessing database with Java programs 	
	THEORY	(15) (Total no.) lectures)
Sub Unit	Unit – I:	5 lectures
1.	<p>Introduction: History of Java, Java features, different types of Java programs, Differentiate Java with C and C++, JVM, JIT and JRE. Java Basics: Variables and data types, declaring variables, literals: numeric, Boolean, character and string literals, keywords, type conversion and casting. Standard default values, Java Operators, Loops and Controls</p> <p>Introduction of Classes: Defining a class, creating instance and class members : creating object of a class, accessing instance variables of a class, creating methods, naming methods of a class, accessing methods of a class, constructor, parameterized constructor, ‘this’ keyword, garbage collection, finalize() method, methods overloading, constructor overloading, nested and inner classes, static member.</p> <p>Arrays and Strings: One and two dimensional array, creating an array, strings, string buffer.</p>	

2.	<p>Inheritance: Types of inheritance, super and subclasses, keywords - 'extends', 'super', constructor chaining, method overriding, final variables and methods, final classes, abstract method and classes, dynamic method dispatch.</p> <p>Interface: Defining interfaces, extending interfaces, implementing interfaces.</p>	
	Unit – II:	5 lectures
1.	<p>Packages: System packages, using system package, Naming conventions, creating packages, accessing a package, using a package, adding a class to a package</p> <p>Exception Handling: Exception-handling fundamentals, Exception types, Uncaught exceptions, Using try and catch, Multiple catch clauses, nested try statements, use of throw, throws and finally keywords, Java's Built-in exceptions, User-defined exception, Chained Exception.</p>	
2.	<p>Introduction to Thread Programming: Introduction to Threads, Creating Threads, Lifecycle of a Thread, Synchronization</p> <p>Streams and File I/O: Concept of streams, stream classes, bytestreamclasses: InputStream, and OutputStream, character stream classes : Reader and Writer, Difference between byte stream classes and character stream classes, other I/O classes. File class, Reading /writing bytes / characters, random access file, serialization.</p>	
	Unit – III:	5 lectures
1.	<p>Swing: JColorChooser, JComboBox, JFileChooser, JInternalFrame, JLabel, JMenuBar, JOptionPane, JLayeredPane, JDesktopPane, JPanel, JPopupMenu, JProgressBar, JRootPane, JScrollBar, JScrollPane, JSeparator, JSlider, JSplitPane, JTabbedPane, JTable, JTableHeader, JToolBar, JToolTip, JTree, JViewPort, JEditorPane, JTextPane, JTextArea, JTextField, JPasswordField, JButton, JMenuItem, JCheckBox-MenuItem, JRadioButton- MenuItem, JCheckBox, JRadioButton, JMenu</p>	
2.	<p>Event Handling: The Delegation Event Model, Event classes (ActionEvent, FocusEvent, InputEvent, ItemEvent, KeyEvent, MouseEvent, MouseWheelEvent, TextEvent, WindowEvent) and various listener interfaces (ActionListener, FocusListener.</p>	

	ItemListener, KeyListener, MouseListener, MouseMotionListener, TextListener, WindowFocusListener, WindowListener), Adapter Classes, Inner Classes. JDBC: Introduction To JDBC, JDBC Architecture, Types Of JDBC Drivers & Differences, Common JDBC Components, Importing Packages, Registering JDBC Drivers, Opening Connection, connecting a Java program to a Database, Executing Query, Statement Class & Objects, Getting Information from Database, Obtaining Result Set Information, DML Operations through JDBC	
	[A] Evaluation scheme courses– 50 marks (i) Continuous assessment (CA) -25 marks (ii) SEE Practical -25 marks	
References:	1. Chapters 6-11, 15, 17, 19, 21-24, 22, 29-30 from: Java : The CompleteReference, by Herbert Schildt 7th Edition 2. Chapters 2-13, 14, 16, 18, from: Programming with Java A primer, by E.Balagurusamy 3rd Edition.	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	3	3	2	8
II	3	3	2	8
III	3	3	3	9

TOTAL MARKS PER OBJECTIVE	9	9	7	25
% WEIGHTAGE	36	36	28	100

Course Code: JUSVSD- SEC201	Course Title: Java Programming Practical (Practicals/Week: 02 hrs)
	<ol style="list-style-type: none"> 1. Write a Java program to create a Java class : <ol style="list-style-type: none"> 1. without instance variables and methods, 2. with instance variables and without methods, 3. without instance variables and with methods, 4. with instance variables and methods. 2. Write a Java program that illustrates the concepts of selection statement, looping, nested loops, breaking out of loop. 3. Write a Java Program that illustrates the concepts of one, two dimension arrays and strings. 4. Write a Java program that illustrates the concepts of Java class that includes <ol style="list-style-type: none"> 1. constructor with and without parameters, 2. Overloading methods, 3. Overriding methods. 5. Write a Java program to demonstrate inheritance by creating suitable classes. 6. Create a Java package, interface and implement in Java program. 7. Practicals on thread Programming 8. Write a program that illustrates the error handling using exception handling. 9. Write a program that illustrates the concepts of stream classes. 10. Write a Java program to illustrate Swing package, Event classes and listeners.

	11. Practicals on JDBC
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Vocational Skill Elective Courses

Course Code: JUSVSD- VSC101	Course Title: Introduction to Programming with C++	Credits: 02 Lectures/Week: 01
Course description	Understanding the concepts of C and C++ and designing and developing applications.	
Learning objectives	<ul style="list-style-type: none"> • Understand the features and concepts of C, C++ supporting object-oriented programming • Understand how to apply the object-oriented concepts to implement object-oriented programs in C++. • Ability to handle possible errors during program execution. 	
Course Outcomes	<ul style="list-style-type: none"> • Interpret the basic principles of C Programming. • To design, implement, debug and test programs using the fundamental elements of C/C++ • An understanding of the concepts of OOPs including inheritance and polymorphism. • An ability to incorporate file handling, virtual functions in object-oriented programs 	
	THEORY	15 Lectures
Sub Unit	Unit – I:	5 Lectures
1.	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.	

2.	Operators and Expressions: Arithmetic operator, unary operators, relational and logical operators, assignment operators, the conditional operator.	
3.	Conditional Statements and Loops: If Statement, If-Else Statement, While Loop, Do While, For Loop, Nested Loops, Infinite Loops, Switch Statement.	
4.	Functions: Overview, defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes, Recursion	
	Unit – II	5 Lectures
1.	Pointers: Fundamentals, declarations, Pointers Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization,	
2.	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.	
3.	Classes and Objects: Class declaration, constructors, constructor initialization lists, access functions, private member functions, class destructor, static data members, static function members, friend function.	
	Unit – III:	5 Lectures

1.	File Handling: Classes for file stream operations, opening and closing a file, detecting end of file, file modes, file pointers and their manipulations.	
2.	Inheritance: Inheritance, protected class members, overriding, private access verses protected access, virtual functions and polymorphism, virtual destructors, abstract base classes.	
	[A] Evaluation scheme courses– 50 marks (i) Continuous assessment (CA) -25 marks (ii) SEE Practical -25 marks	
References:	1. Object Oriented Analysis and Design, Timothy Budd (2012).: Tata McGraw Hill 2. Object Oriented Programming with C++, E. Balagurusamy.: Tata McGraw Hill 3. Programming with C by Byron Gottfried , second edition.McGraw Hill	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDG E	UNDERSTANDIN G	APPLICATIO N	TOTAL MARKS
I	4	4	2	10
II	3	2	3	8

III	2	2	3	7
TOTAL MARKS PER OBJECTIVE	9	8	8	25
% WEIGHTAGE	36	32	32	100

Course Code: JUSVSD-VSC101	Course Title: Introduction to Programming with C++ Practical (Practicals/Week: 02 hrs)
	<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>3. 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>4. 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>

- e. Write a program to find the factorial of a number using a recursive function.
- 5. Classes and methods**
- 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.
- 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.
- 6. Friend Functions**
- a. Write a friend function for adding the two complex numbers, using a single class.
- b. Write a friend function for adding the two different distances and display its sum, using two classes.
- c. Design a class Complex for adding the two complex numbers and also show the use of constructor.
- 7. Constructor and method overloading**
- a. Design a class Complex for adding the two complex numbers and also show the use of constructor.
- b. Design a class Geometry containing the methods area() and volume() and also overload the area() function
- c. Design a class Static Demo to show the implementation of static variable and static function.
- 8. File handling**
- 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
- 9. 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++
- 10. 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.
- 11. Virtual function and abstract class**
- a. Implement the concept of method overriding.

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|--|--|
| | <ul style="list-style-type: none">b. Show the use of virtual functionc. Show the implementation of abstract class |
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Course Code JUSVSD- VSC201	Course Title: Introduction to Database	Credits: 02 Lectures/Week: 01
Course description	The course will cover topics including an overview of the relational data model, understanding entities and relationships, designing logical data models and database design using the process of normalization.	
Learning objectives	<ul style="list-style-type: none"> • To have a broad understanding of database concepts and database management system software • To have a high-level understanding of major DBMS components and their function • To be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. • To be able to write SQL commands to create tables and indexes, insert / update / delete data, and query data in a relational DBMS. 	
Course Outcomes	<ul style="list-style-type: none"> • This course introduces database design and creation using a DBMS product. • Emphasis is on data dictionaries, normalization, data integrity, data modeling and creation of simple tables, queries, reports, and forms. • Upon completion, students should be able to design and implement normalized database structures by creating simple database tables, queries, reports, and forms. 	
	THEORY	(15) (Total no.) lectures)
Sub Unit	Unit – I:	05 lectures
1.	Introduction : What is Database? What is a Database Management System? Purpose of database system Data models : Types of Data Models Codd's 12 rules	
2.	ER Diagram Data Integrity Keys : Types of Keys	
3.	Functional Dependencies	

	Normalization : 1NF, 2NF, 3NF	
	Unit – II:	05 lectures
1.	Constraints : What is constraint? Types of constraints Introduction to Relational Algebra and Calculus	
2.	SQL : DML statements, DDL statements, DCL statements, DQL statements, TCL statements, FROM clause, duplicate rows(DISTINCT), row selection, search conditions, sorting query results, group by & order by queries Joins : Inner Join, Left Outer Join, Right Outer Join	
3.	Subqueries : SingleRow & MultipleRow Subquery, Joined relations Views : Introduction to views, data independence, updates on views, comparison between tables and views SQL, NullValues	
	Unit – III:	05 lectures
1.	Transaction management and Concurrency control: Transaction management, ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Optimistic methods, Database recovery management.	
2.	Triggers : Row-Level Trigger, Statement-Level Trigger	
	[A] Evaluation scheme courses– 50 marks (i) Continuous assessment (CA) -25 marks (ii) SEE Practical -25 marks	
References:	1. A Silberschatz, H Korth, S Sudarshan, “Database System and Concepts”, fifth Edition McGrawHill 2. Rob, Coronel, “Database Systems”, SeventhEdition 3. An introduction to Databasesystems-C.J.Date	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDG E	UNDERSTANDIN G	APPLICATIO N	TOTAL MARK S
I	04	03	03	10
II	02	03	03	8
III	02	02	03	7
TOTAL MARKS PER OBJECTIVE	08	08	09	25
% WEIGHTAG E	32	32	36	100

Course Code: JUSVSD- VSC201	Practical Title: Introduction to Database Practical (Practicals/Week: 02 hrs)
	<ol style="list-style-type: none"> 1. Design a Database and create required tables. For e.g. Bank, College Database and insert meaningful values 2. ALTER, UPDATE and DELETE statements 3. Apply the constraints like Primary Key, Foreign key, NULL&Check onstraint. 4. To learn how to use GRANT and REVOKE in MySQL 5. Write the query for implementing the following functions <ol style="list-style-type: none"> 1. Numeric function 2. Character function 3. Date function 6. Write the queries to implement the joins. 7. Write queries to implement tuple calculus concept 8. Write the queries to using operators. 9. Create views 10. Demonstrate Subqueries

	11. Write the queries to implement transactions concept <ol style="list-style-type: none"> 1. COMMIT 2. ROLLBACK 3. SAVEPOINT 4. RELEASE SAVEPOINT 5. SET TRANSACTION
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Ability Enhancement Courses

Course Code	Course Title: English Language Skills	Credits: 02 Lectures/Week: 02
Course description	This course introduces the learners to the basics of English language and enhances the learners' use of linguistic skills for improved expression.	
Learning objectives	It is expected that students: <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 	
Course Outcomes	At the end of the course, students would have: <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

	<p>Texts and paragraphs that incorporate the above taken from:</p> <ul style="list-style-type: none"> - Scientific journals - Literary texts - Newspaper articles - Any other relevant source 	
	Unit – III: Creative Writing (to be covered in Tutorials)	10 Lectures
	<ul style="list-style-type: none"> a) Essays b) Blogs c) Stories d) Dialogues 	
	<p>Evaluation Scheme</p> <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>	
References:	<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. and New Delhi: Kogan Press Limited. Print. 3. Bellare, Nirmala. (1998). Reading Strategies. Vols. 1 and 2. New Delhi. Oxford University Press. Print. 4. Blass, Laurie, Kathy Block and Hannah Friesan. (2007). Creating Meaning. Oxford: Oxford University Press. 5. Buscemi, Santi and Charlotte Smith. (1994). 75 Readings Plus. Second Edition New York: McGraw-Hill. Print. 6. Career Skills Library. (2009). Communication Skills (Third Edition). New York: Ferguson Publishing. Print. 7. Doff, Adrian and Christopher Jones. (2004). Language in Use (Intermediate and Upper Intermediate). Cambridge: Cambridge University Press. Print. 8. 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. 9. Greenbaum, Sidney and Gerald Nelson. (2002). An Introduction to English Grammar (Second Edition). London: Longman. Print. 10. Grellet, F. (1981). Developing Reading Skills. Cambridge: 	

Cambridge University Press. Print.

11. 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.

12. Hood, J.H. (2013). How to Book of Writing Skills: Improve your English report, email or business. USA: WordCraft Global. Print.

13. Langan, John. (2008). College Writing Skills with Readings (Seventh Edition). New York: McGraw Hill Higher Education. Print.

14. 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/](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/>

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS

I	2	2	4	8
II	2	2	4	8
III	2	3	4	9
TOTAL MARKS PER OBJECTIVE	6	7	12	25
% WEIGHTAGE	24	28	48	100

Course Code JUSVSD-AEC201	Course Title: English Communication Skill	Credits: 02 Lectures/Week: 02
Course description	This course introduces the learners to the basics of English communication skills to enhance the learners' job preparedness.	
Learning objectives	It is expected that students: <ul style="list-style-type: none"> ● Become equipped to use communication skills effectively in personal and professional spheres ● Enhance their writing and listening skills ● Apply effective communication skills to become job ready 	
Course Outcomes	Students would have been able to: <ul style="list-style-type: none"> ● Demonstrate the skills required for effective corporate communication ● Understand and apply the basics of written communication in personal and professional contexts ● Write cogent job applications, resume, formal letters and professional emails 	

	THEORY	(30 Lectures)
Sub Unit	Unit – I: Theory of Communication	10 Lectures
	a) Concept of Communication: Meaning, Process, 7 Cs of Communication, Significance of Communication Skills in personal and professional life b) Methods: Verbal and Nonverbal Communication and their Application c) Cultivating effective listening skills	
	Unit – II: Professional Writing Skills (theory and application)	10 Lectures
	a) Documentation: Minutes and note-making b) Business reports c) Email writing and etiquettes	
	Unit – III: Job Search and Application Skills (Tutorials)	10 Lectures
	a) LinkedIn Profile: Making and Management b) Job Application c) Resume	
	[A] Evaluation scheme for Theory courses -50 Marks 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 II. Semester End Examination (SEE)- 25 Marks	
References:	1. Bellare, Nirmala (1998). Reading Strategies. Vols. 1 and 2. New Delhi. Oxford University Press. 2. Blass, Laurie, Kathy Block and Hannah Friesan (2007). Creating Meaning. Oxford: OUP. 3. Buscemi, Santi and Charlotte Smith (1994). 75 Readings Plus. Second Edition New York: McGraw-Hill. 4. Doff, Adrian and Christopher Jones (2004) .Language in Use (Intermediate and Upper Intermediate). Cambridge:	

CUP.

5. Glendinning, Eric H. and Beverley Holmstrom (2004). Second edition. Study Reading: A Course in Reading Skills for Academic Purposes. Cambridge: CUP.
6. Grellet, F. (1981). Developing Reading Skills. Cambridge: Cambridge University Press.
7. Hamp-Lyons, Liz and Ben Heasley (2006). Second edition. Study Writing: A Course in Writing Skills for Academic Purposes. Cambridge: CUP.
8. Mohan Krishna & Banerji, Meera (1990). Developing Communication Skills. New Delhi: Macmillan.
9. Mohan Krishna & Singh, N. P. (1995). Speaking English Effectively. New Delhi: Macmillan.
10. Sasikumar, V., Kiranmai Dutt and Geetha Rajeevan (2006). A Course in Listening and Speaking I & II. New Delhi: Foundation Books, Cambridge House.
11. Savage, Alice, et al (2005). Effective Academic Writing. Oxford: OUP.
12. Khanna, Pooja. (2016). English Communication. New Delhi: Vikas Publishing.
13. Khanna, Pooja. (2016). Effective Business Communication. New Delhi: Vikas Publishing.

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/](http://www.io.comi—hcexres/textbook/)
- 7) <http://www.pearsoned.co.uk/AboutUs/ELT/>
- 8) <http://www.howisay.com/>
- 9) <http://www.thefreedictionary.com/>

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

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDG E	UNDERSTANDIN G	APPLICATIO N	TOTAL MARK S
I	2	2	4	8
II	2	2	4	8
III	2	3	4	9
TOTAL MARKS PER OBJECTIVE	6	7	12	25
% WEIGHTAG E	24	28	48	100

Value Education Courses

Course Code : JUSVSD- VEC101	Course Title: Digital Literacy	Credits: 2 Lectures/Week: 02
Course Description	The course aims to help students stay organized, collaborate with others, and create professional documents. From creating and presenting documents, reports and proposals to analyzing data in Excel.	
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 	

Course 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 Excel fill handle Excel formula Excel functions importing data presentation of data application of data analysis	
	Unit – III:	10 Lectures
	Presentations: Creating presentation Slide layouts Transitions Use of tome.app, prezi, Canva Environmental values:	

	Benefits of Green Computing Strategies of Green Computing Power management Green computing applications	
	Evaluation Scheme [A] Evaluation scheme for Theory courses -50 Marks I. Continuous Assessment (C.A.) - 50 Marks One or more, MCQ, quiz based, objective type, puzzle, group presentation, case studies, individual projects, debate, model making, poster making, role play	
References	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	

BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	09	05	03	17
II	03	04	09	16
III	04	04	09	17
TOTAL MARKS PER OBJECTIVE	16	13	21	50

% WEIGHTAGE	32	26	42	100
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Course Code JUSVSD- VEC201	Course Title: Digital Empowerment	Credits: 2 Lectures/Week: 2
Course description	The purpose of this course is to create an awareness among the learners about the digital world, the crimes in the cyber world, how to ensure security and the spread awareness about Digital India.	
Learning objectives	<ul style="list-style-type: none"> • Understand the digital world and need for digital empowerment • Create awareness about Digital India. • Explore, communicate and collaborate in cyberspace. • Building awareness on cyber safety and security. 	
Course Outcomes	<ul style="list-style-type: none"> • Use ICT and digital services in daily life. • Develop skills to communicate and collaborate in cyberspace using social platforms, teaching/learning tools. • Understand the significance of security and privacy in the digital world. • Evaluate ethical issues in the cyber world 	
	THEORY	30
Sub Unit	Unit – I:	10
1.	Digital inclusion and Digital Empowerment	
2.	Needs and challenges	
3.	Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services}, e-Health Campaigns Public utility portals of Govt. of India such as RTI, Health, Finance, Income Tax filing, Education	
	Unit – II:	10

1.	Communication and Collaboration in the Cyberspace Electronic Communication: electronic mail, blogs, social media Collaborative Digital platforms	
2.	Tools/platforms for online learning Collaboration using file sharing, messaging, video conferencing AI tools: ChatGPT, Smartwriter.ai, Grammarly, Pixlr for photo editing	
3.	Vision of Digital India: Broadband Highways , Universal Access to Phones , Public Internet Access Programme ,DigiLocker, E- Hospitals, e-Pathshala, BHIM, e-Kranti (Electronic Delivery of Services} , e-Health Campaigns, Ayushman Bharat Digital Mission Target NET ZERO Imports	
	Unit – III:	10
1.	Towards Safe and Secure Cyberspace Online security and privacy	
2.	Threats in the digital world: Data breach and Cyber Attacks Blockchain Technology	
3.	Security Initiatives by the Govt of India Ethical Issues in Digital World Netiquettes Ethics in digital communication Ethics in Cyberspace	
	Evaluation Scheme [A] Evaluation scheme for Theory courses -50 Marks I. Continuous Assessment (C.A.) - 50 Marks One or more, MCQ, quiz based, objective type, puzzle, group presentation, case studies, individual projects, debate, model making, poster making, role play	
References	1. David Sutton. "Cyber security: A practitioner's guide", BCS Learning & 2. Development Limited, UK, 2017.	

3. <https://www.mha.gov.in/document/downloads/cyber-safety-handbook>

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UNIT	KNOWLEDG E	UNDERSTANDIN G	APPLICATIO N	TOTAL MARK S
I	10	05	05	20
II	05	05	05	15
III	05	05	05	15
TOTAL MARKS PER OBJECTIVE	20	15	15	50
% WEIGHTAG E	40	30	30	100

Indian Knowledge System

Course Code JU-IKS-GEN101	Course Title: Indian Knowledge System	Credits: 02 Lectures/Week: 02
Course description	Explore the historical context and cultural significance of ancient Indian knowledge systems. Highlight the relevance of this knowledge in today's society, showcasing how it has shaped modern India.	
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. 	
Course 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 Shrushuta, Charak , Patanjali in the field of ayurvedic medicine. 	
	THEORY	(Total no.) 30 lectures
Sub Unit	Unit – I:	10 lectures
1.	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
1.	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
1.	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	
	Evaluation Scheme [A] Evaluation scheme for Theory courses -50 Marks II. Continuous Assessment (C.A.) - 50 Marks One or more, MCQ, quiz based, objective type, puzzle, group presentation, case studies, individual projects, debate, model making, poster making, role play	
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	

	<p>4. B. Mahadevan, V. Bhat, Introduction to Indian Knowledge Systems, PHI Learning Pvt. Ltd, 2022.</p> <p>5. D.M. Bose, S.N. Sen, B.V. Subbarayappa. A concise history of Science in India, Universities Press, Ed. 2, 2009, Hyderabad.</p>
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BLOOMS TAXONOMY IN EVALUATION SCHEME

UNIT	KNOWLEDGE	UNDERSTANDING	APPLICATION	TOTAL MARKS
I	13	05	02	20
II	13	05	02	15
III	13	05	02	15
TOTAL MARKS PER OBJECTIVE	39	15	06	50
% WEIGHTAGE	38	28	34	100