

RAMDEOBABA UNIVERSITY

[RBU]

NAGPUR - 440013



RBU

RAMDEOBABA UNIVERSITY, NAGPUR
Formerly Shri Ramdeobaba College of Engineering & Management (RCOEM) Est. 1984

TEACHING & EVALUATION SCHEME

BACHELOR OF COMPUTER APPLICATION

School of Computer Science & Engineering

2025-2029

Semester-I

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuou s Assessme nt	End Sem / Intern al Eval	Tota l	Duratio n of End Semeste r
1	ESC	25CS18TP0101	Fundamentals of Programming	3	2	4	50 + 25	50 + 25	150	03 Hrs
2	ESC	25CS18TP0102	Digital Circuits	3	2	4	50 +25	50 +25	150	03 Hrs
3	VSE C	25CS18PR0103	Programming Workshop - I	0	2	1	25	25	50	-
4	BSC	25HS01TP0102	ChemInformatics	3	2	4	50 +25	50+25	150	03 Hrs
5	BSC	25HS03TH0108	Matrices and Calculus	3	0	3	50	50	100	03 Hrs
6	AEC	25HS02TP0106	English for Professional Communication	2	2	3	50+25	50+25	150	02 Hrs
7	VEC	25HS02TH0104	Foundational course in Universal Human Values	1	0	1	50	-	50	-
8	CCA	25HS02PR0105	Liberal/Performing Art	0	2	1	25	25	50	-
			TOTAL	15	12	21	450	400	850	

Liberal/ Performing Art Bucket

Sr . No.	Course Code	Course Title	L	P	Credit s	Contin uous Evalu ation	End Sem Exam/ Internal Evaluation	Total	ESE Duration
1	25HS02PR0105-01	Fundamentals of Indian Classical Dance: Bharatnatayam	0	2	1	25	25	50	NA
2	25HS02PR0105-02	Fundamentals of Indian Classical Dance: Kathak	0	2	1	25	25	50	NA
3	25HS02PR0105-03	Introduction to Digital Photography	0	2	1	25	25	50	NA

4	25HS02PR0105-04	Introduction to Basic Japanese Language	0	2	1	25	25	50	NA
5	25HS02PR0105-05	Art of Theatre	0	2	1	25	25	50	NA
6	25HS02PR0105-06	Introduction to French Language	0	2	1	25	25	50	NA
7	25HS02PR0105-07	Introduction to Spanish Language	0	2	1	25	25	50	NA
8	25HS02PR0105-08	Art of Painting	0	2	1	25	25	50	NA
9	25HS02PR0105-09	Art of Drawing	0	2	1	25	25	50	NA
10	25HS02PR0105-10	Nature Camp	0	2	1	25	25	50	NA
11	25HS02PR0105-11	Developing Self-awareness	0	2	1	25	25	50	NA
12	25HS02PR0105-12	Art of Poetry	0	2	1	25	25	50	NA
13	25HS02PR0105-13	Creative and content writing	0	2	1	25	25	50	NA
14	25HS02PR0105-14	Science of life through Bhagwad Gita	0	2	1	25	25	50	NA
15	25HS02PR0105-15	Sanskrit Sambhasan-Spoken Sanskrit	0	2	1	25	25	50	NA
16	25HS02PR0105-16	Kirtan Kala	0	2	1	25	25	50	NA
17	25HS02PR0105-17	Introduction to German Language and culture	0	2	1	25	25	50	NA
18	25HS04PR0102-1	Adventure Sports	0	2	1	25	25	50	NA
19	25HS04PR0102-2	Introduction to Defense Forces & Obstacle Training	0	2	1	25	25	50	NA
20	25HS04PR0102-3	First Aid & Disaster Management	0	2	1	25	25	50	NA
21	25HS04PR0102-4	Basic Nutritional Course	0	2	1	25	25	50	NA

22	25HS04PR0102-5	Stress Management Through Yoga & Meditation	0	2	1	25	25	50	NA
23	25EE07PR0105	Day-to-Day Electrical Systems	0	2	1	25	25	50	NA

Semester-II

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	ESC	25CS18TP0201	Object Oriented Programming	3	2	4	50+25	50+25	150	03 Hrs
2	PCC	25CS18TH0202	Computer Architecture and Organization	3	0	3	50	50	100	03 Hrs
3	VSEC	25CS18PR0203	Programming Workshop - II	0	2	1	25	25	50	-
4	VEC	25CS18TH0204	Cyber Laws & Ethics in IT	2	0	2	50	50	100	02 Hrs
5	BSC	25HS05TP0202	Basics of Quantum Computing	3	2	4	50+25	50+25	150	03 Hrs
6	BSC	25HS03TP0218	Foundation of Probability and Statistics	3	2	4	50+25	50+25	150	03 Hrs
7	IKS	25HS02TH0207	Foundational Literature of Indian Civilization	2	0	2	50	50	100	02 Hrs
8	CCA	25HS04PR0204	Health-Fitness-Wellbeing	0	2	1	25	25	50	-
TOTAL				16	10	21	425	425	850	

Exit Option: Award of Undergraduate Certificate after securing 42 credits and an additional 8 Credits

Exit Courses

1.	Computer Hardware and Networking	Online/offline Certification Course	8
2.	Advanced JAVA programming		8
3.	Python Programming		8
4.	Web Designing		8

Semester-III

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	PCC	25CS18TP0301	Introduction to Data Structures	4	2	5	50+25	50+25	150	03 Hrs
2	VSEC	25CS18PR0302	IT Infrastructure Services Lab	0	2	1	25	25	50	-
3	VEC	25CS18PR0303	Software Lab	0	2	1	25	25	50	-
4	VEC	25CS18PR0304	Project based Learning	0	4	2	25	25	50	-
5	EEM	25CS18TH0305	Principles of Management	2	0	2	50	50	100	02 Hrs
6	MDM	25CS18TH0306	MDM-I	3	0	3	50	50	100	03 Hrs
7	BSC	25HS03TH0305	Discrete Mathematics & Graph Theory	3	0	3	50	50	100	03 Hrs
8	OEC	25ID118TH0301	Open Elective -I	2	0	2	50	50	100	02 Hrs
9	BSC	25HS01TH0303	Environmental Science	2	0	2	50	50	100	02 Hrs
10	AUD	25HS04PR0301	Self-Defence & Indian Martial Arts	0	2	0	-	-	-	-
			TOTAL	16	12	21	400	400	800	

Semester-IV

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	PCC	25CS18TP0401	Introduction to Database Management Systems	4	2	5	50+25	50+25	150	3 hrs
2	PCC	25CS18TP0402	Introduction to Operating Systems	3	2	4	50+25	50+25	150	3 hrs
3	PCC	25CS18TP0403	Introduction to Computer Networks	3	2	4	50+25	50+25	150	3 hrs
4	PCC	25CS18TH0404	Theory of Computation	3	0	3	50	50	100	3 hrs
5	VEC	25CS18TH0405	Creativity, Innovation & Design Thinking	2	0	2	50	50	100	02 Hrs
6	MDM	25CS18TH0406	MDM-II	3	0	3	50	50	100	03 Hrs
7	OE	25ID118TH0401	Open Elective - II	2	0	2	50	50	100	02 Hrs
TOTAL				20	06	23	400	400	800	

Exit Option: Award of Undergraduate Diploma after securing 86 credits and an additional 8 Credits

Exit Courses			
1.	Web Development	Online/offline Certification Course	8
2.	Mobile Development		8
3.	Data Analyst		8
4.	Ethical Hacking		8
5.	IT certified data engineer		8
6.	Blockchain and its application		8

Semester-V

S. No	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	PCC	25CS18TP0501	Introduction to Data Science	3	2	4	50+25	50+25	150	03 hrs
2	PCC	25CS18TP0502	Analysis of Algorithms	4	2	5	50+25	50+25	150	03 Hrs
3	PCC	25CS18TP0503	Software Engineering	3	2	4	50+25	50+25	150	03 hrs
4	AEC	25CS18PR0504	Basic Competitive Coding	0	2	1	50	-	50	-
5	VSE C	25CS18PR0505	Mini Project – I	0	4	2	75	75	150	-
6	MDM	25CS18TH0506	MDM-III	3	0	3	50	50	100	03 Hrs
7	OE	25ID118TH0501	Open Elective - III	2	0	2	50	50	100	02 Hrs
			TOTAL	15	12	21	450	400	850	

Semester-VI

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	PCC	25CS18PR0601	Mobile Applications and Development Lab	0	4	2	25	25	50	-
2	PCC	25CS18TP0602	Internet and Web Technologies	4	2	5	50+25	50+25	150	03 hrs
3	PCC	25CS18TP0603	Artificial Intelligence	3	2	4	50+25	50+25	150	03 hrs
4	PCC	25CS18TH0604	Basics of Ethical Hacking	3	0	3	50	50	100	03 hrs
5	PEC	25CS18TP0605	Program Elective -I	3	2	4	50+25	50+25	150	03 hrs
6	VSE C	25CS18PR0606	Mini Project – II	0	4	2	75	75	150	-
7	AEC	25CS18PR0607	Advanced Competitive Coding	0	2	1	50	-	50	-
8	AEC	25CS18PR0608	Participative Learning	0	2	1	50	-	50	-
9	MDM	25CS18TH0609	MDM-IV	3	0	3	50	50	100	03 Hrs
TOTAL				16	18	25	525	425	900	

Exit Option: Award of Undergraduate Degree after securing 132 credits and an additional 8 Credits

Exit Courses		
1.	Project	-
		8

Semester-VII/VIII

Sr. No.	Course type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem Exam	Total	Exam Duration
1	PCC	25CS18TP0701	Machine Learning	3	2	4	50+25	50+25	150	03 Hrs
2	PCC	25CS18TH0702	Data Mining	3	0	3	50	50	100	03 Hrs
3	PEC	25CS18TH0703	Program Elective -II	3	0	3	50	50	100	03 Hrs
4	PEC	25CS18TP0704	Program Elective - III	3	2	4	50+25	50+25	150	03 Hrs
5	PRJ	25CS18PR0705	Project -III	0	8	4	75	75	150	-
TOTAL				12	12	18	325	325	650	

Semester-VIII/ VII

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	PCC	25CS18TH0801	Introduction to Deep Learning	4	0	4	50	50	100	03 Hrs
2	PEC	25CS18TP0802	Program Elective -IV	3	2	4	50+25	50+25	150	03 Hrs
3	PEC	25CS18TP0803	Program Elective -V	3	2	4	50+25	50+25	150	03 Hrs
TOTAL				10	4	12	200	200	400	

OR

S. No.	Course Type	Course Code	Course Name	L	P	C	Continuous Assessment	End Sem / Internal Eval	Total	Duration of End Semester
1	INT R	25CS18PR0804	Full Semester Internship/ Research Internship/ TBI	0	24	12	200	100	300	-

- Research Methodology course of 3 credits should be taken by those students who are going for a Research Internship. These credits are inclusive of 12.

Award of Undergraduate Degree with Honors after securing 162 credits

ELECTIVE BASKET

Micro Specialization	Elective-1 (With Lab) [SEM-6]	Elective-2 [SEM-7]	Elective-3 (With Lab) [SEM-7]	Elective-4 (With Lab) [SEM-8]	Elective-5 (With Lab) [SEM-8]
Cloud	Distributed and Parallel Databases	Administration Cloud	Development on Cloud	AI & ML on Public Cloud Platform	Cloud Security
Security	Intrusion Detection and Prevention System	Ethical Hacking	Vulnerability Assessment and Penetration Testing	Cyber Risk Assessment & Management	Auditing IT Infrastructure for Compliance
Image processing and NLP	Computer Graphics	Digital Image Processing	Natural Language Processing	Computer Vision	Deep Learning for Computer Vision and NLP

OPEN ELECTIVE

Semester	Course Name
Semester-III [Open Elective-I]	Cyber Laws & Ethics/ Statistical Computing with R/Introduction to Data Science
Semester-IV [Open Elective-II]	Tools for Data Science/Web Development/Mobile App Development
Semester-V [Open Elective-III]	Data Analytics Visualization/Open-Source Technologies/Basics of Ethical Hacking

Multidisciplinary Minor [MDM] Track

[For Students other than School of Computer Science & Engineering]

Semester	MDM	Track
Semester-III	MDM-I	Introduction to Web Development
Semester-IV	MDM-II	Front End Development
Semester-V	MDM-III	Backend Technologies
Semester-VI	MDM-IV	Cloud Technologies

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25CS18TP0101

Course: Fundamentals of Programming

L: 3 Hrs P: 2 Hr, Per Week

Total Credits: 4

Course Objectives

1. Understand logic for simple problem statements.
2. Learning coding problems involving statements like decision-making and loops, functions, etc.
3. Explore modular programming.
4. Understand the concepts based on arrays, structures, file operations, etc.

Course Outcomes

On successful completion of the course, student shall be able to

1. Design logic for simple problem statements.
2. Code problem statements involving decision-making and loops.
3. Use functions for modular programming.
4. Apply the concept of arrays in coding.
5. Apply the concept of structures in coding.
6. Perform file operations.

SYLLABUS

Unit I: Introduction to components of a computer system, Algorithm and Flowchart for problem-solving.

Introduction to C language: Keywords, Constant, Variable, Data types, Operators, Types of Statements, Decision Control Statement- if and Conditional operators.

Unit II: Switch case statement, Loops, Pre-processor Directives.

Unit III: Concept of functions, User defined and Library Functions, parameter passing, Recursion, Storage class, Pointers.

Unit IV: Arrays: 1-D, 2-D, Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Pointers to the array, Command line arguments.

Unit V: Structures, Simple structures, Array of Structures

Unit VI: File handling Streams in C, Types of Files, File Input/ Output Operations: Modes of file opening, Reading and writing the file, Closing the files, using fflush ().

Text Books :

1. The C Programming Language: B. W. Kernighan and D. M. Ritchie, Second Edition, Pearson, June 2015
2. Programming in ANSI C: E. Balguruswami McGraw Hill
3. Programming in C: B. Gottfried, Second Edition, Schaum Outline Series, Tata Mc-Graw Hill Publishers, 1996

Reference Books

1. Mastering C: K. R. Venugopal and S. R. Prasad, Tata McGraw Hill
2. Let Us C: Yashwant Kanetkar, BPB Publication

Lab Syllabus:

Minimum 8 practicals based on the syllabus.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25CS18TP0102

Course: Digital Circuits

L: 3 Hrs P: 2 Hrs, Per Week

Total Credits: 4

Course Objective

1. Understand the basics of digital systems, including number systems and arithmetic operations.
2. Learn the minimization techniques and Boolean algebra.
3. Explore the combinational as well as sequential circuits.
4. Comprehend microprocessor fundamentals and programming concepts.

Course Outcomes

After successful completion of this course, the student will be able to,

1. Apply the knowledge of number systems and arithmetic operations to solve problems.
2. Apply minimization techniques and Boolean algebra to simplify logic functions and its realization.
3. Design and analyse combinational as well as sequential circuits.
4. Use microprocessor programming concepts to write simple Assembly language programs.

SYLLABUS

UNIT-I

Basics of number Systems and operations

Introduction to digital systems and their applications, number systems (binary, decimal, octal, hexadecimal), Binary Codes: BCD, Excess-3, Gray, Arithmetic Operations, Signed Number Representation.

UNIT-II

Minimization Techniques and Switching Circuits

Boolean Algebra, Boolean Algebraic Theorems, Representation of Boolean functions, Logic simplification techniques: Karnaugh maps up to five variables, Quine-McCluskey method, Map manipulation-essential prime implicants, non-essential prime implicants. Basic, Universal and Special Purpose Gates, Realization of logic using universal gates.

UNIT-III

Combinational Logic Circuits

Design Procedure of Combinational Circuit, Arithmetic Circuits: Adder (Half, Full, Parallel, Carry look-ahead, Serial, BCD, Excess-3), Subtractor, Non-Arithmetic Circuits: Code Converter, Magnitude Comparator, Multiplexer, Decoder, De-Multiplexer, Encoder, Parity Generators/Checkers, Hazards.

UNIT-IV

Sequential Circuit-I

Latches and flip-flops: Triggering, SR-latch, JK, D and T Flip Flop, Race Around Condition: Master Slave Flip-flop, Conversion of FFs, Analysis –Setup Time, Hold Time, Characteristics equations, State table, Excitation table, Introduction to memory: Random access memory, Read only memory, Programmable Logic Devices.

UNIT-V

Sequential Circuit-II

Asynchronous/ripple counter, synchronous counter, Synchronous counter Design, State diagram and State table, Shift registers and applications, Mealey & Moore Finite State Machines.

UNIT-VI

Fundamentals of 8085 Microprocessor

Microprocessor Architecture, Addressing Modes, Instruction set, Assembly language programming.

Text Books

1. A. Anand Kumar; Fundamental of Digital Electronics; Second Edition, PHI, 2016
2. Morris Mano; Digital Logic Design; Fourth edition, McGraw Hill, 2018
3. Ramesh Gaonkar; 8-bit Microprocessor; CBS Publishers; 2011

Reference Books

1. Roger L. Tokheim; Digital Electronics: Principles and Applications; Eighth edition, McGraw Hill, 2013
2. R P. Jain, Kishor Sarawadekar, Modern Digital Electronics, 5th Edition, 2022

Lab:

DIGITAL ELECTRONICS:

Practicals based on-

1. Verification of Truth Table for gates
2. Karnaugh map Reduction and Logic Circuit Implementation.
3. Verification of DeMorgan's Laws.
4. Implementation of Adder and Subtractor.

MICROPROCESSORS (8086 Assembly Language Programming)

Practicals based on-

1. 8 Bit/ 16 bit Addition and Subtraction.
2. BCD Addition and Subtraction.
3. 8 Bit Multiplication and Division.
4. Searching and Sorting

Syllabus for Semester I, Bachelor of Computer Application

Course Code : 25CS18PR0103

Course : Programming Workshop -I

L: 0 Hrs P: 2Hr, Per Week

Total Credits: 1

Course Outcomes

On successful completion of the course, students will be able to:

1. Perform Data Analysis using MS Excel.
2. Design static web pages using HTML.
3. Demonstrate proficiency in web page styling.
4. Develop websites using MS Excel, HTML and CSS

MS Excel

Complex formulas: INDEX-MATCH and array formulas, Pivot tables for comprehensive data analysis, Advanced charting for dynamic data visualization, Conditional formatting for data insights, Automating tasks with macros, Data validation for error-free data entry

HTML

Creation of headers, paragraphs, links, importing of images, tables, designing of forms, and document structure of HTML.

HTML-5

Navigation in Webpage, Multimedia based tags- audio, video, iframe, Creating Animations.

CSS & Bootstrap

Introduction to Cascading Style Sheets, Features, Core syntax, Style Sheets and HTML StyleRule, Text Properties

Text Books

1. Microsoft Excel 2019: Data analysis and Business Modelling, Wayne Winston, PHI
2. HTML & CSS: The Complete Reference, Thomas Powell, MGH
3. Web Design: A Beginner's Guide, Wendy Willard, MGH

PRACTICAL LIST

Course: COMPUTER WORKSHOP-I LAB

1. MS Excel: INDEX-MATCH and Array Formula

Suppose you manage a sales department and have a dataset containing sales data, including salespersons, products, sales amount, and the date of sales.

- a. Find the sales amount for a specific salesperson and product with INDEX-MATCH.
- b. Calculate the total sales for each salesperson using an array formula.

2. MS Excel: PivotTable

Assume we have sales data for a company that sells products in different regions through various salespersons. Our dataset includes columns for Date, Region, Salesperson, Product, Quantity Sold, and Sales Amount. Create and customize a PivotTable report in Excel to analyze and summarize sales data efficiently.

3. MS Excel: Dynamic Vata visualization

Assume we have sales data for different products across several months. Demonstrate on how to create advanced dynamic charts in Excel that update based on user input using various features in Excel, such as named ranges, data validation, and advanced chart types.

4. MS Excel: Conditional Formatting

Suppose you manage a sales team and have a dataset containing monthly sales data for each team member. Use conditional formatting in Excel to highlight top performers, identify underperformers, and visualize sales trends over time.

5. MS Excel: Macros

Demonstrate on how to automate the task of creating a weekly sales report using macros in Excel.

6. HTML

Design a static web page using HTML to display information about department of CSE and ET, which includes the following:

- a. Headings and paragraphs
- b. Line breaks and horizontal rules
- c. Format the text by using formatting tags
- d. Create a navigation bar and provide links to various web pages like About Department, Achievements, Placements, etc.
- e. Insert ordered and unordered lists

7. HTML

Create HTML web page for T&P Registration by taking the controls for First

Name, Last Name, Date of Birth, Department (User has to select from dropdown list), Gender (take radio buttons), Semester-wise Marks, Uploading the Resume and any other information along with Accept terms and conditions etc. T&P Registration details must be displayed in a table.

8. HTML & CSS

Develop an online shopping website showing Home page first using HTML and CSS. Home page shows different items along with details. Once Item is purchased then click on the Item Image, open a new web page containing a feedback form.

9. HTML5 and CSS Animations

Design a webpage using advanced HTML5 tags for MP tourism.

- a. Details of any four tourist attractions in MP
- b. Each tourist location should have image, audio, and video related to its significance.
- c. Include iframes in the webpage.
- d. Include css animations.

10. HTML5 and Bootstrap

Design a responsive web page for Alumni Feedback using HTML5 and Bootstrap.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS01TP0102

Course: ChemInformatics

L: 3 Hrs, P: 2 Hrs, Per Week

Total Credits: 4

Course Outcomes:

After the successful completion of the course, students shall be able to

CO1: Analyze the fundamental concepts of Cheminformatics and apply chemical data representation techniques

CO2: Classify and explain the properties, synthesis, and applications of conducting, semiconducting, and insulating materials used in computer hardware.

CO3: Identify and explain the chemical and thermal interactions affecting material compatibility and degradation

CO4: Analyze the physicochemical and biological factors influencing drug properties.

CO5: Apply molecular docking techniques and virtual screening methods for computer-aided drug design.

CO6: Utilize cheminformatics tools for chemical structure visualization and data management.

Unit- I: Introduction to Cheminformatics

Introduction to Cheminformatics, overview of the field and its applications, Introduction to databases, Types of database, Chemical data representation, Introduction of line notations, SMILES, SMARTS

Unit-II: Materials in computer hardware

Conducting materials – conducting polymers, synthesis and applications.

Semiconduction materials - semiconductors, doping, Silicon wafer production

Insulating materials- Plastics, ceramics and fibre glass.

Unit-III: Chemical Interactions

Material compatibility (Interfacial reactions, material degradation), Thermal Interactions (Thermal degradation, Inter-metallic compound formation)

Factors influencing degradation- moisture, humidity, stress, temperature, chemical and biological agents.

Unit -IV: Drug and Data Bases

Drug and Data bases: Introduction, classification of drugs, Drug Solubility and factors affecting it, permeability and factors affecting it, Drug Likeness Introduction to Pharmacokinetics and Pharmacodynamics, ADMET

Unit-V: Computer Aided Drug Design

Introduction to molecular docking, rigid docking, flexible docking- shape complementarity, 3D data base searching and virtual searching, brief introduction about various online tools for drug designing and molecular docking.

Unit-VI: Tools for Cheminformatics

Visualization tools like ChemDraw, Data management tools like PubChem, ChEMBL, ChemSpider etc.

Text Books

1. Upadhayay, K. Upadhayay, N. Nath, Biophysical Chemistry (Principles and Techniques), Himalaya Publishing House, 2009.
2. David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, Fifth Edition, W. H. Freeman and Company, New York, 2008.
3. Young David. Computational drug design: A Guide for Computational and Medicinal Chemists. Publisher: Wiley. 2009. ISBN: 9780470126851
4. Elementary Organic Spectroscopy by Y. R. Sharma

Reference books

1. Chem-informatics: Basic Concepts and Methods" edited by Thomas Engel and Johann Gasteiger
2. Introduction to Bioinformatics by Arthur M. Lesk University of Cambridge, Published in the United States by Oxford University Press Inc., New York
4. Abraham, Donald (Ed). Burger's medicinal chemistry and drug discovery. Publisher: John Wiley & Sons, Inc. 2003. ISBN: 0471270903
5. Schlick, T. Molecular modelling and simulation: an interdisciplinary guide. Publisher: Springer. 2002. ISBN: 0-387-95404-X
6. Leach, Andrew. Molecular Modelling: Principles and Applications. Publisher: Prentice Hall. 2001. ISBN: 0582239338.
7. Jensen, Jan H. Molecular Modeling Basics. Publisher: CRC Press. 2010. ISBN: 978-1420075267
8. Hinchliffe Alan. Molecular modelling for beginners. Publisher: John Wiley and Sons Ltd. 2008. ISBN: 978 0470513149

E- Text book

1. Computer Aided Drug Design by Prof. Mukesh Doble, Biotechnology, IIT, Madras (Swayam NPTEL)
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Lab:

Course Outcomes

1. CO1: Apply the fundamental principles of measurement, preparation of solution, handling of hazardous chemicals and also estimate the amount of different elements present in the given samples.
2. CO1: Use open online tools and various search tools for understanding the properties and functioning of various biomolecules/Chemicals and analyse the spectral properties for qualitative and quantitative analysis

. List of Experiments:

1. To understand the functions of various biologically important biomolecules and to search Material Safety Data Sheets of different biomolecules / hazardous bio-chemical
2. Preparation of different Solutions: Molar solution, Normal solution and percent solution and Determination of concentration.
3. Basic statistical analysis of results of neutralization of acid against the base and preparing acceptable graphs using software.
4. To compute and analyze the structures and molecular bondings in the bio-molecules / drugs using open online software such as Chem-Sketch, etc..
5. To compute and analyze the bio-activity of drugs molecule / new molecular structure using open online software such as Molinspiration, etc
6. To study chemical kinetics of per-oxydisulphate and iodide ions reactions and to find out order of the reaction and analysis of experimental data using Computational Software
7. Determination of rate of the reaction at room temperature and analysis of experimental data using Computational Software
8. Prediction of infrared/NMR spectral and analytical data of organic molecules using Computational Software.
9. Spectroscopic/Colorimetric determination of wavelength of maximum absorption of chemical/biological compound in solution and determination of concentration using Lambert's- Beer's Law.
10. Estimation of Fe²⁺ ions spectro-photometrically.

Suggested Books/Reference Books:

1. S. S. Dara, A Textbook on Experiments and Calculations in Engineering Chemistry, S. Chand Publications.

2. J. B. Yadav, Advanced Practical Physical Chemistry, Krishna' s Prakashan Media (P) Limited.
3. A. J. Elias, Collection of Interesting General Chemistry Experiments, Universities Press Publications.
4. V. K. Ahluwalia, S. Dhingra and A. Gulati, College Practical Chemistry, Universities Press Publications. **a g e**

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS03TH0108

Course: Matrices and Calculus

L: 3 Hrs P: 0 Hr, Per Week

Total Credits: 3

Course Objective

The objective of this course is to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes

On successful completion of the course, student shall be able to

1. Identify the type and order of Matrix and perform various binary operation on Matrices.
2. Interpret the solutions of system of linear equations and use the concepts of Eigen values, Eigen vectors to find diagonalization of matrices.
3. Differentiate and Integrate trigonometric, algebraic, exponential and logarithmic functions.
4. Differentiate multivariable functions .
5. Find Maxima and Minima of function of one and several variables

Syllabus

Module 1 : (8 Lectures)

Algebra of matrices, types of matrices, and matrices of order two and three, Properties of determinants, evaluation of determinants, Adjoint and evaluation of inverse of a square matrix using determinants, orthogonal matrices, symmetric matrices.

Module 2:(8 Lectures)

Rank of matrix, Consistency of system of linear equations and its solution, solution of linear system of equations by using inverse and rank concept, linearly dependent and independent vectors, Eigen values and eigenvectors, Diagonalization of matrices

Module 3: (8 Lectures)

Differentiation: Limits of a function, Differentiability, Differentiation of the sum, difference, product, and quotient of two functions, Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit functions, definite Integration and Indefinite integration.

Module 4: (8 Lectures)

Partial Differentiation: Partial derivatives, higher order partial derivatives, Euler's Theorem, Deduction of Euler's theorem, Chain rule

Module 5: (8 Lectures)

Application of Derivative: Monotonic increasing and decreasing functions, Maxima, and minima of functions of one variable, Maxima, and minima of functions of several variables, Lagrange's method for finding Maxima and Minima.

Textbooks/References

1. Thomas Finney, Calculus, Pearson Low price edition, 2018
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
5. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02TP0106

Course: English for Professional Communication

L: 2 Hrs, P: 2 Hr, Per Week

Total Credits: 3

Course Objectives

The main objective of this course is to enhance the employability skills of students as well as prepare them for effective work place communication.

Course Outcomes:

On successful completion of the course the students will be able to achieve the following:

1. Demonstrate effective use of word power in written as well as oral communication.
2. Understand the techniques of listening and apply the techniques of reading comprehension used in professional communication.
3. Apply the principles of functional grammar in everyday as well as professional communication.
4. Effectively implement the comprehensive principles of written communication by applying various writing styles.
5. Create precise and accurate written communication products.

Unit I: Vocabulary Building

6 hours

- 1.1 Importance of using appropriate vocabulary
- 1.2 Techniques of vocabulary development
- 1.3 Commonly used power verbs, power adjectives and power adverbs.
- 1.4 Synonyms, antonyms, phrases & idioms, one-word substitutions and standard abbreviations

Unit II: Listening and Reading Comprehension

6 hours

- 2.1 Listening Comprehension: active listening, reasons for poor listening, traits of a good listener, and barriers to effective listening
- 2.2 Reading Comprehension: types and strategies.

Unit III: Functional Grammar and Usage

6 hours

- 3.1 Identifying Common Errors in use of: articles, prepositions, modifiers, modal auxiliaries, redundancies, and clichés
- 3.2 Tenses
- 3.3 Subject-verb agreement, noun-pronoun agreement
- 3.4 Voice

Unit IV: Writing Skills

6 hours

- 4.1 Sentence Structures
- 4.2 Sentence Types
- 4.3 Paragraph Writing: Principles, Techniques, and Styles

Unit V: Writing Practices

6 hours

- 5.1 Art of Condensation: Précis, Summary, and Note Making
- 5.2 Correspondence writing techniques and etiquettes – academic writing
- 5.3 Essay Writing

Books

1. *Communication Skills*. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
2. *Practical English Usage*. Michael Swan. OUP. 1995.
3. *Remedial English Grammar*. F.T. Wood. Macmillan.2007
4. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
5. *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
6. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

List of practicals

Computer Assisted + Activity Based Language Learning

Practical 1: Everyday Situations: Conversations and Dialogues – Speaking Skills

Practical 2: Pronunciation, Intonation, Stress, and Rhythm

Practical 3: Everyday Situations: Conversations and Dialogues – Listening Skills

Activity Based Language Learning

Practical 4: Presentation Skills: Orientation & Mock Session

Practical 5: Presentation Skills: Practice

Practical 6: Group Discussions: Orientation & Mock Session

Practical 7: Group Discussions: Practice

Practical 8: Personal Interviews: Orientation & Mock Session

Practical 9: Personal Interviews: Practice

Syllabus for Semester I, Bachelor of Computer Application

Course Code:25HS02TH0104

Course: Foundational course in Universal Human Values

L: 1 Hrs P: 0 Hr, Per Week

Total Credits: 1

Course Objectives:

- To help the student see the need for developing a holistic perspective of life.
- To sensitize the student about the scope of life - individual, family (inter-personal relationship), society and nature/existence.
- To strengthen self-reflection.
- To develop more confidence and commitment to understand, learn and act accordingly.

Course Outcome:

On completion of course, students will be able to achieve the following:

- 1: Develop a holistic perspective of life
- 2: Better understanding of inter-personal relationships and relationship with society and nature.
- 3: An ability to strengthen self-reflection

SYLLABUS

Unit I:- Aspirations and concerns

5 hours

Need for Value Education: Guidelines and content of value education.

Exploring our aspirations and concerns: Knowing yourself, Basic human aspirations Need for a holistic perspective, Role of UHV; Self-Management: harmony in human being

Unit II:- Health

4 hours

Harmony of the Self and Body, Mental and physical health; Health for family, friends and society.

Unit III:- Relationships and Society

5 hours

Harmony in relationships, Foundational values: Trust, Respect, Reverence for excellence, Gratitude and love; harmony in society; harmony with nature.

Reference Material

The primary resource material for teaching this course consists of

Text book:

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

Reference books:

1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
9. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-01

Course: Fundamentals of Indian Classical Dance:
Bharatnatayam

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Total Credits: 01

Course objective

The course aims to introduce the students to Bharatnatyam, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

Course Outcomes

On completion of the course, students will be able to achieve the following:

CO1: Understand the importance of dance and Bharatnataym as an Indian dance form

CO2: Develop skills to perform the dance form at its basic level.

CO3: Evaluate their strengths and interest to take bridge course to give *Pratham* (1st level formal exam of Bharatnatayam).

Syllabus

Practical -1: Orientation in Bharatnatayam

Practical-2: Tattu Adavu till 8, Naatta Adavu 4 Steps, Pakka Adavu 1 step, Metta Adavu 1 Step, Kuditta Metta Adavu 4 Steps,

Practical -3: Practice sessions

Practical-4: Tatta Kuditta Adavu (Metta), Tatta Kuditta Adavu (Metta) 2 Steps, Tirmanam Adavu 3 Steps, Kattu Adav - 3 Steps, Kattu Adav - 3 Steps

Practical-5: Practice sessions

Practical-6: Tiramanam (front) 3 Steps, Repeat of Tiramanam (Overhead) 3 Steps,

Practical-7: practice sessions

Practical - 8: final practice sessions and performances.

Recommended reading

1. *Introduction to Bharata's Natyasastra*, Adya Rangacharya, 2011
2. *The Natyasastra and the Body in Performance: Essays on the Ancient Text*, edited by Sreenath Nair, 2015
3. *Bharatanatyam How to ... : A Step-by-step Approach to Learn the Classical Form*, Eshwar Jayalakshmi, 2011

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-02 **Course: Fundamentals of Indian Classical Dance: Kathak**
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week **Total Credits: 01**

Course objective

The course aims to introduce the students to Kathak, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

Course Outcomes

On completion of the course, students will be able to achieve the following:

CO1: Understand the importance of dance and Kathak as an Indian dance form

CO2: Develop skills to perform the dance form at its basic level.

CO3: Evaluate their strengths and interest to take bridge course to give *Prarambhik* (1st level formal exam of Kathak).

Syllabus

Practical -1: Orientation in Kathak. Correct posture of kathak, Basic Movements and exercise Stepping, Chakkar of 5 count (Bhramari),

Practical -2: practice sessions of practical 1

Practical -3: Hastaks, Hastaks and Steppings, Reciting asamyukta Mudra shloka, Hastak and steppings

Practical -4: practice sessions of practical 3

Practical -5: Todas and Asamyukta hasta mudra shlok, Vandana of Shlok, 2 Todas and Vandana, Ghante Ki Tihai,

Practical -6: practice sessions of practical 5

Practical -7: 2 1 Chakkardar Toda and Ginnti Ki Tihai, 2 Todas and 1 Chakkardar Toda, practice sessions

Practical -8: Final performances.

Recommended reading

1. Kathak Volume1 A "Theoretical & Practical Guide" (Kathak Dance Book), Marami Medhi & Debasish Talukdar, 2022, Anshika Publication (13 September 2022)

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-03
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Introduction to Digital Photography
Total Credits: 01

Course objective

The course aims to develop basic skills of students in digital photography to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

CO1: Develop an understanding of the technical aspects and aesthetics of Photography.

CO2: Apply the rules of digital photography for creating photographs.

CO3: Develop skills to enhance photographs through post processing.

CO4: Create a portfolio of their photographs in selected genre.

Syllabus

Practical 1: **Orientation in digital photography:** Genres, camera handling and settings

Practical 2: **Rules of Composition**

Practical 3: **Rules of Composition:** practice sessions

Practical 4: **Understanding Exposure and Art of Pre-Visualization**

Practical 5: **Rules of Composition and Art of Pre-Visualization:** practice sessions

Practical 6: **Post Processing Photographs and Portfolio creation**

Practical 7: **Post Processing Photographs:** practice sessions

Practical 8: **Portfolio finalization and presentation in selected genre.**

Reference material

1. Scott Kelby (2020) *The Digital Photography Book: The Step-by-Step Secrets for how to Make Your Photos Look Like the Pros*, Rocky Nook, USA
2. Larry Hall (2014) *Digital Photography Guide: From Beginner to Intermediate: A Compilation of Important Information in Digital Photography*, Speedy Publishing LLC, Newark
3. J Miotke (2010) *Better Photo Basics: The Absolute Beginner's Guide to Taking Photos Like a Pro*, AMPHOTO Books, Crown Publishing Group, USA

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-04
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Introduction to Basic Japanese Language
Total Credits: 01

Course objective

The course aims to develop basic communication skills in Japanese Language and help develop a basic understanding of Japanese culture for effective cross-cultural communication.

Course outcome

After the completion of the course the students will be able to achieve the following:

CO1: Basic understanding about Japan as a country and Japanese culture.

CO2: Ability to use vocabulary required for basic level communication in Japanese language.

CO3: Able to frame simple sentences in Japanese for everyday conversations

Syllabus

Practical-1: Orientation about Japan, its language, and its culture

Practical-2: Communication Skills 1: Vocabulary for basic Japanese language

Practical -3: Practice sessions

Practical-4: Basic day to day greetings in Japanese language and their usage through role-play

Practical-5: Practice sessions

Practical- 6: Communication Skills 2: framing sentences

Practical- 7: Practice sessions

Practical- 8: Introduction of Japanese Culture, Arts, Traditions, Etiquettes and Manners etc.

Recommended reading

1. Marugoto Starter (A1) Rikai - Course Book for Communicative Language Competences, by The Japan

Foundation, Goyal Publishers & Distributors Pvt. Ltd (ISBN: 9788183078047)

2. Japanese Kana Script Practice Book – Vol. 1 Hiragana, by Ameya Patki, Daiichi Japanese Language Solutions (ISBN: 9788194562900)

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-05

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Art of Theatre

Total Credits: 01

Course objectives:

The course aims to develop in the students, an actor's craft through physical and mental training.

Course Outcomes:

On completion of the course, students will be able to achieve the following:

CO1: Understand and synthesize the working of the prominent genres of theatre across the world.

CO2: Apply the skill of voice and speech in theatre and public speaking

CO3: Apply the art of acting and also develop generic skills such as confidence, communication skills, self-responsibility, motivation, commitment, interpersonal skills, problem solving, and self-discipline.

CO4: Apply skills acquired related to technical/production aspects of theatre and also develop problem solving and interpersonal skills.

Syllabus:

Syllabus

Practical 1: **Orientation in theatre**

Practical 2: **Voice and Speech training**

Practical 3: **Voice and Speech training:** practice sessions

Practical 4: **Art of acting**

Practical 5: **Art of acting:** practice sessions

Practical 6: **Art of script writing**

Practical 7: **Art of script writing:** practice sessions

Practical 8: **Final performances**

Reference books:

1. Boleslavsky, R. (2022). *Acting: The First Six Lessons* (1st ed., pp. 1-92). Delhi Open Books.

2. Shakthi, C. (2017). *No Drama Just Theatre* (1st ed., pp. 1-171). Partridge.

3. Bruder, M., Cohn, L. M., Olnek, M., Pollack, N., Previto, R., & Zigler, S. (1986). *A Practical Handbook for the Actor* (1st ed.). Vinatge Books New York.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-06
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Introduction to French Language
Total Credits: 01

Course objective:

To help build a foundation and interest in French language so that the students can pursue the proficiency levels of the language in higher semesters.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:

- CO1. Demonstrate basic knowledge about France, the culture and similarities/differences between India and France
- CO2. Learn to use simple language structures in everyday communication.
- CO3. Develop ability to write in basic French about themselves and others.
- CO4. Develop ability to understand beginner level texts in French

Syllabus

List of Practicals

Practical-1: Orientation about France, the language, and culture

Practical-2: Communication Skills 1: Vocabulary building for everyday conversations

Practical -3: Practice sessions

Practical-4: Reading and writing Skills : Reading and writing simple text in French

Practical-5: Practice sessions

Practical-6: Communication Skills 2: listening comprehension

Practical-7: Practice sessions

Practical-8: Writing Skills: Write basic French and practice

Recommended reading

1. 15-minute French by Caroline Lemoine
2. Cours de Langue et de Civilisation Françaises by G. Mauger Vol. 1.1
3. Cosmopolite I by Natalie Hirschsprung, Tony Tricot

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-07
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Introduction to Spanish Language
Total Credits: 01

Course objective:

To help build a foundation and interest in Spanish language so that the students can pursue the proficiency levels of the language in higher semesters.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:

CO1. Demonstrate basic knowledge about Spain, the culture and similarities/differences between India and France

CO2. Learn to use simple language structures in everyday communication.

CO3. Develop ability to write in basic Spanish about themselves and others.

CO4. Develop ability to read and understand beginner level texts in Spanish

Syllabus

List of Practicals

Practical-1: Orientation about Spain, the language, and culture

Practical-2: Communication Skills 1: Vocabulary building for everyday conversations

Practical -3: Practice sessions

Practical-4: Reading and writing Skills : Reading and writing simple text in Spanish

Practical-5: Practice sessions

Practical-6: Communication Skills 2: listening comprehension

Practical-7: Practice sessions

Practical-8: Writing Skills: Write basic Spanish and practice

Recommended reading

1. 15-Minute Spanish by Ana Bremon
2. Aula Internacional 1 by Jaime Corpas ,Eva Garcia, Agustin Garmendia.
3. Chicos Chicas Libro del Alumno by María Ángeles Palomino

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-08
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Art of Painting
Total Credits: 01

Course objective

Painting is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in painting to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

- CO1: Become familiar with the basic methods, techniques & tools of painting.
- CO2: Train the eye and hand to develop sense of balance, proportion and rhythm.
- CO3: Develop the ability to observe and render simple natural forms.
- CO4: Enjoy the challenging and nuanced process of painting.

Syllabus

Practical 1: **Orientation in Painting tools & basics of lines, shapes, light, shadows and textures**

Practical 2: **The art of observation** how to see shapes in drawing

Practical 3: **Introduction Water color** how to handle water paints

Practical 4: **Introduction to acrylic colors** how to handle acrylic paints

Practical 5: **Explore layering paint and capturing the quality of light with paint.**

Practical 6: **Create landscape painting**

Practical 7: **Create Abstract painting**

Practical 8: **Paint on Canvas** (try to recreate any famous painting)

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Alla Prima II Everything I Know about Painting--And More by Richard Schmid with Katie Swatland
3. Daily Painting: Paint Small and Often To Become a More Creative, Productive, and Successful Artist by Carol Marine

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-09
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Art of Drawing
Total Credits: 01

Course objective

Drawing is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in drawing to lay a foundation for them as a hobby and/or a profession.

Course outcome:

At the end of the course the students will be able to achieve the following:

CO1: Become familiar with the basic methods, techniques & tools of drawing.

CO2: Train the eye and hand to develop sense of balance, proportion and rhythm.

CO3: Develop the ability to observe and render simple natural forms.

CO4: Enjoy the challenging and nuanced process of drawing.

Syllabus

Practical 1: **Orientation in Drawing tools & basics of lines, shapes, light, shadows and textures**

Practical 2: **The art of observation** how to see shapes in drawing

Practical 3: **One/two-point basic linear perspective**

Practical 4: **Nature drawing and landscapes**

Practical 5: **Gestalt principles of visual composition**

Practical 6: **Figure drawing:** structure and proportions of human body

Practical 7: **Gesture drawing:** expression and compositions of human figures

Practical 8: **Memory drawing:** an exercise to combine the techniques learnt

Reference material

1. Drawing made easy by Navneet Gala; 2015th edition
2. Perspective Made Easy (Dover Art Instruction) by Ernest R. Norling

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-10

Course: Nature Camp

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Total Credits: 01

Course Objective: To create an opportunity for the students to develop affinity with nature and thus subsequently impact their ability to contribute towards sustainability of nature.

Course outcome:

After the completion of the course the students will be able to do the following:

CO1: Develop an affinity with nature by observing and understanding its marvels with guidance from experts

CO2: Develop an understanding of the challenges and solutions associated with nature and its conservation.

Course content

In collaboration with the Forest Department and/or a local NGO working in the field of environment conservation, this course would be conducted in 24 hours. Students will be taken to a tiger reserve in Central Indian region or Forest fringe villages or work with an NGO from Central Indian region working on natural resource management. The camps (for 2 days) will cover any one of the following topics as decided by the course coordinator:

1. Awareness about each element of biodiversity (camps on moths, butterflies, birds, other wildlife etc)
2. Environment management (water, forest, wildlife) – practices of Forest Department in managing a tiger reserve, and other aspects of water and forest conservation.
3. Sustainable natural resource management - initiatives by rural communities and local NGOs
4. Man-animal conflict and solutions (socio-economic and technical) – role of local communities and Forest Department
5. Traditional practices in environment conservation – role of local communities and local NGOs

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-11
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Developing Self-awareness
Total Credits: 01

Course objectives:

The course aims to develop students in their personal as well as professional life by means of graphotherapy, NLP, and Neurobics

Course Outcomes:

On completion of the course, students will be able to achieve the following:

CO1: Gain foundational understanding of graphology and through self-analysis will achieve greater awareness about their strengths and weaknesses & areas for personal growth

CO2: students will be equipped with tools and techniques for continuous self-improvement, using signature analysis and graphotherapy as part of their personal development journey

CO3: understand how to use Neuro Linguistic Programming (NLP) strategies to set and achieve goals effectively, overcoming mental blocks and limiting beliefs.

CO4: Enhance ability to absorb, retain, and recall information, which can benefit academic and professional performance.

Syllabus:

Practical 1: **The Power of Handwriting (Handwriting is Brainwriting)**

Practical 2: **Know yourself through handwriting**

Practical 3: **The Role of Signature in your life**

Practical 4: **Graphotherapy to enhance yourself in all ways**

Practical 5: **Neurolinguistic Programming , S.M.A.R.T Goal**

Practical 6: **Effective Communication Model, Rapport Building and Anchor**

Practical 7: **Brain Directives & Linguistic Presuppositions**

Practical 8: **Neurobics**

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-12
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Course: Art of Poetry
Total Credits: 01

Course Outcomes:

To familiarize the students with the art of poetry and develop a sense of appreciation for the art

At the end of the course the student will be able to achieve the following:

CO1: Understand the origin and development of poetry

CO2: Appreciate the art of poetry in life

CO3: Develop aesthetic sense

CO4: Develop holistic perspective to their personality

Syllabus

Practical 1: **Art of poetry - orientation**

Practical 2: **Forms of poetry - orientation**

Practical 3: **Forms of poetry - recitation**

Practical 4: **Application of poetry - orientation**

Practical 5: **Application of poetry - practical session**

Practical 6: **Poetry and aesthetics**

Practical 7: **Writing poetry - orientation**

Practical 8: **Writing poetry - writing sessions**

Reading material

I. The Art of Poetry

1. Fry, S. (2005). *The ode less travelled: Unlocking the poetic mind*. HarperCollins.
2. Addonizio, K., & Laux, D. (1997). *The poet's companion: A guide to the pleasures of writing poetry*. W.W. Norton & Company.
3. Lucy, J. (Ed.). (2001). *The art of poetry*. Penguin Books.

II. Understanding and Interpretation of Poetry

1. Hirsch, E. (1999). *How to read a poem: And fall in love with poetry*. Harcourt Brace & Company.
2. Pinsky, R. (1998). *The sounds of poetry: A brief history*. Farrar, Straus and Giroux.
3. Meyer, M. (2005). *Poetry: An introduction*. Bedford/St. Martin's.

III. Writing Poetry

1. Hugo, R. (1979). *The triggering town: Lectures and essays on poetry and writing*. W.W. Norton & Company.
2. Bradbury, R. (1990). *Zen in the art of writing: Releasing the creative genius within you*. Bantam Books.
3. Behn, R., & Twichell, C. (Eds.). (1992). *The practice of poetry: Writing exercises from poets who teach*. HarperCollins.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-13
L: 00 Hrs, **T:** 0 Hr, **P:** 2 Hrs, **Per Week**

Course: Creative and content writing
Total Credits: 01

Course objective:

The objective of the course is to equip students with comprehensive skills in creative and content writing through experiential learning and real-world applications.

Course outcomes:

On completion of the course, student will be able to achieve the following:

CO1: Understand and apply fundamental concepts and techniques of creative writing.

CO2: Apply storytelling techniques to create engaging narratives.

CO3: Develop and implement effective SEO and digital content strategies

CO4: Create and refine content using various tools and applying diverse writing styles and formats.

CO5: Utilize digital tools to craft multimedia narratives and create a professional portfolio.

Syllabus

Creative Writing

Practical 1: **Introduction to Creative and Content Writing**

Practical 2: **Character and Story Development**

Practical 3: **Crafting Compelling Narratives**

Content Writing

Practical 4: **SEO and Digital Content Strategies**

Practical 5: **Writing for Media**

Practical 6: **Tools**

Content Creation

Practical 7: **Digital Storytelling**

Practical 8: **Creative Portfolio Launch**

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-14

Course: Science of life through Bhagwad Gita

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Total Credits: 01

Course Objective

The objective of the course is to seek directions from the Bhagwad Gita to garner life skills for a successful and happy life

Course Outcome

CO1: To understand the methodology to correctly interpret and analysis the scripture

CO2: To understand the application of various teaching of the Bhagwad Gita

CO3: Use meditation and breathing techniques for healthy mind and body.

Syllabus

Practical 1: **Introduction to Bhagwad Gita - methodology**

Practical 2: **Real life application of chapter 1-3**

Practical 3: **Real life application of chapter 4-6**

Practical 4: **Real life application of chapter 7-9**

Practical 5: **Real life application of chapter 10-12**

Practical 6: **Real life application of chapter 13-15**

Practical 7: **Real life application of chapter 16-18**

Practical 8: **Meditation and breathing techniques**

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-15

Course: *Sanskrit Sambhashan- Spoken Sanskrit*

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Total Credits: 01

Course objectives:

The objective of the course is to enhance the communication skills of the students in Sanskrit

Course outcome

At the end of the course, the students will be able to achieve the following:

CO1: Enhanced writing skills in Sanskrit

CO2: Enhanced speaking skills in Sanskrit

CO3: Enhanced listening skills in Sanskrit

CO4: Enhanced writing skills in Sanskrit

Syllabus:

प्रथमं दिनम्

- ❖ गीतम् - पठत संस्कृतम्..... ।
- ❖ मम नाम - भवतः नाम किम्? भवत्याः नाम किम्?
द्वयोः मध्ये परिचयः । परस्परं 5 जनान् ।
- ❖ सः कः? सा का? तत् किम्?
- ❖ एषः, एषा, एतत् ।
- ❖ अहम्, भवान्, भवती..... अभिनयः ।
- ❖ आम्, न, वा/किम्..... अभिनयः ।
- ❖ अस्ति × नास्ति..... अभिनयः ।
- ❖ अत्र, तत्र, कुत्र, सर्वत्र, अन्यत्र, एकत्र - अभिनयः ।
- ❖ षष्ठी - तस्य, एतस्य, कस्य, तस्याः, एतस्याः, कस्याः, मम, भवतः, भवत्याः..... अभिनयः ।
मम नासिका, भवतः नासिका, भवत्याः नासिका ।
एतत् कस्य? अङ्गानि प्रदर्श्य प्रश्नः ।
- ❖ दशरथस्य...., सीतायाः...., लेखन्याः...., पुस्तकस्य.... ।
स्फोरकपत्रस्य (Flash Card) उपयोगः करणीयः ।
'पुत्रः' 'पतिः' इत्यादीनां वाक्यपत्राणाम् (Charts) उपयोगः करणीयः ।
- ❖ गीतम् - मनसा सततं स्मरणीयम् ।
- ❖ आवश्यकम्, मास्तु, पर्याप्तम्, धन्यवादः, स्वागतम् ।
- ❖ पूर्वनिश्चितसम्भाषणप्रदर्शनम् ।
- ❖ क्रियापदानां पाठनम् -
गच्छति । आगच्छति । पठति । लिखति । खादति । पिबति ।
क्रीडति । वदति । उत्तिष्ठति । उपविशति ।
- ❖ गच्छामि । आगच्छामि..... ।
- ❖ गच्छतु । आगच्छतु..... ।
- ❖ सङ्ख्याः - (अ) 1, 2, 3, 4,.....10 ।
(आ) 10, 20, 30,.....100 ।
- ❖ समयः - 5.00, 5.15, 5.30, 4.45 ।
- ❖ कथा - गतानुगतिको लोकः । (काचित् कथा सरलया भाषया वक्तव्या) ।
- ❖ रटनाभ्यासः (पूर्वमेव लिखितानि पठितानि च कानिचित् वाक्यानि वाचनीयानि) ।
- ❖ एकं वाक्यम् (प्रत्येकं छात्रः एकं वाक्यं वदेत् ।)
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

द्वितीयं दिनम्

- ❖ गीतम् ।
- ❖ पुनस्स्मारणम् ।
- ❖ शब्देषु लिङ्गभेदज्ञापनम् - यथा -सः सुधाखण्डः, सा कुञ्जिका, तत् पुष्पम् ।
- ❖ बहुवचनपाठनम् -
बालकाः...., बालिकाः...., लेखन्यः...., पुस्तकानि... ।
- ❖ ते, के, ताः, काः, तानि, कानि, एते, एताः, एतानि, भवन्तः, भवत्यः, वयम् । (चित्राणि उपयोक्तव्यानि ।)
- ❖ वचनपरिवर्तनाभ्यासः । यथा - सः बालकः - ते बालकाः ।
- ❖ अस्ति - सन्ति ।
- ❖ कति?
- ❖ सप्तमी - हस्ते । उत्पीठिकायाम् । लेखन्याम् । पुस्तके ।
(स्फोरकपत्रस्य प्रयोगः करणीयः ।)
- ❖ वाक्यपत्रस्य उपयोगेन वाक्यानि वाचनीयानि ।
- ❖ कदा?
- ❖ उत्तराणां प्रश्नाः । (शिक्षकः आरम्भे उत्तरं वदेत्, अनन्तरं छात्राः तस्य प्रश्नं पृच्छेयुः ।)
यथा - रामः प्रातःकाले शालां गच्छति ।
रामः कदा शालां गच्छति?
- ❖ अद्य, धः, परश्चः, प्रपरश्चः, ह्यः, परह्यः, प्रपरह्यः, इदानीम् ।
- ❖ गीतम् ।
- ❖ गच्छन्ति । गच्छामः । गच्छन्तु ।
- ❖ शिष्टाचारः - सुप्रभातम्/नमस्कारः/शुभरात्रिः/हरिः
ओम्/क्षम्यताम्/चिन्ता मास्तु ।
- ❖ प्रातर्विधिः - दन्तधावनम् इत्यादयः शब्दाः पाठनीयाः ।
- ❖ सङ्ख्या - 1-50 ।
- ❖ समयः - 6.05, 6.10, 5.55, 5.50
- ❖ स्वागतसम्भाषणम् । (शिक्षकः सहशिक्षकेण सह कृत्वा प्रदर्शयेत्)
- ❖ कथा ।
- ❖ रटनाभ्यासः ।
- ❖ वाक्यद्वयम् (प्रत्येकम् अपि छात्रः वाक्यद्वयं वदेत् ।)
- ❖ सूचनाः ।
- ❖ ऐक्यमन्त्रः ।

तृतीयं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ क्रियापदानां बहुवचनरूपाणि ।
गच्छन्ति - गच्छामः - गच्छन्तु (Chart दर्शनीयम्)
पिबन्ति - पिबामः - पिबन्तु ।
लिखन्ति - लिखामः - लिखन्तु ।
इत्यादिपरिवर्तनाभ्यासः कारणीयः ।
- ❖ द्वितीयाविभक्तिः - स्फोरकपत्राणाम् उपयोगः ।
(वाक्यपत्राणि उपयुज्य वाक्यानि वाचनीयानि ।)
- ❖ कृपया ददातु - वस्तुनि प्रदर्श्य ।
शिक्षकः एकैकं वस्तु प्रदर्शयति ।
उदा. - ग्रन्थः, घटी,.....
छात्राः - कृपया ग्रन्थं ददातु, कृपया घटीं ददातु इत्यादि
वदेयुः । (स्फोरकपत्रस्य उपयोगः)
- ❖ पुरतः, पृष्ठतः, वामतः, दक्षिणतः, उपरि, अधः ।
(चित्रं दर्शनीयम्)
- ❖ इतः, ततः,तः, गृहतः, कुतः?
(स्फोरकपत्राणाम् उपयोगः)
वाक्यपत्राणि उपयुज्य वाक्यानि वाचनीयानि ।
- ❖ गीतम् ।
- ❖ कथम्? सम्यक् ।
- ❖ शीघ्रम् × मन्दम् । उच्चैः × शनैः ।
- ❖ पठनार्थम्, किमर्थम्?
- ❖ सप्तकाराः - किम्, कुत्र, कति, कदा, कुतः, कथम्,
किमर्थम् (Chart प्रदर्शनीयम्) ।
एकैकम् उपयुज्य परस्परं प्रश्नाः ।
- ❖ अपि ।
- ❖ अस्तु ।
- ❖ अहं न जानामि । - कानिचन वाक्यानि ।
- ❖ भूतकालीनक्रियापदानां पाठनम् ।
गतवान् - पठितवान् - लिखितवान् ।
गतवती - पठितवती - लिखितवती ।
- ❖ क्रियापदकोष्ठकस्य प्रथमपृष्ठस्य अभ्यासः ।
- ❖ द्वितीयपृष्ठस्य सर्वाणि क्रियापदानि उपयुज्य छात्राः
वर्तमानकाले वाक्यानि वदन्ति । (ए.व - ब.व.)
- ❖ विशिष्टक्रियापदानाम् अभ्यासः -
करोमि - कुर्मः । करोति - कुर्वन्ति ।
ददामि - ददमः । ददाति - ददति ।

शृणोमि - शृणुमः । शृणोति - शृण्वन्ति ।

जानामि - जानीमः । जानाति - जानन्ति ।

- ❖ सम्बोधनम् - भोः !, श्रीमन् !, मान्ये !, भगिनि!, मित्र !,
.....महोदय!, राम !, सीते ! इत्यादि ।
- ❖ सङ्ख्या- 1-100 ।
- ❖ समयः - 1.00, 2.00, 3.00, 4.00 ।
- ❖ सम्भाषणप्रदर्शनम् (मित्रसंलापः) ।
- ❖ कथा ।
- ❖ वाक्यत्रयम् एकैकोऽपि छात्रः वदेत् ।
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

चतुर्थं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ च
- ❖ अतः
- ❖ एव
- ❖ इति
- ❖ अस्मि
- ❖ यदि -तर्हि
- ❖ यथा - तथा
- ❖ तः - पर्यन्तम् (वाक्यपत्रस्य उपयोगेन वाक्यानि
वाचनीयानि ।)
- ❖ अद्य आरभ्य
- ❖ कृते (वाक्यपत्रस्य उपयोगः कारणीयः)
- ❖ क्तवतुप्रत्ययान्तानाम् अभ्यासः
गतवान् - पठितवान् - लिखितवान् (ए.व. पुलिङ्गे) ।
गतवती - पठितवती - लिखितवती (ए.व. स्त्रीलिङ्गे) ।
गतवन्तः - पठितवन्तः - लिखितवन्तः (ब.व. पुलिङ्गे) ।
गतवत्यः - पठितवत्यः - लिखितवत्यः (ब.व. स्त्रीलिङ्गे) ।
- ❖ सः गतवान् - सा गतवती - लिङ्गपरिवर्तनाभ्यासः ।
- ❖ अहं गतवान् - अहं गतवती - लिङ्गपरिवर्तनाभ्यासः ।
- ❖ क्रियापदानां कालपरिवर्तनाभ्यासः ।
यथा - गच्छति - गतवान्, गतवती ।
- ❖ गीतम् ।
- ❖ विशेषपाठनम् - आसीत्, आसन्, आसम् ।
- ❖ एकः, एका, एकम् - लिङ्गभेदः जापनीयः ।
(स्फोरकपत्रस्य उपयोगः)

- ◆ भोजनसम्बन्धिशब्दाः यथा - सुपः, शाकम्, इत्यदयः ।
- ◆ सङ्ख्या ।
- ◆ समयः ।
- ◆ ॐ - सङ्ख्याक्रीडा ।
- ◆ कथा ।
- ◆ सम्भाषणप्रदर्शनम् ।
- ◆ चत्वारि वाक्यानि ।
- ◆ सूचना ।
- ◆ ऐक्यमन्त्रः ।

पञ्चमं दिनम्

- ◆ गीतम् ।
- ◆ पुनःस्मरणम् ।
- ◆ वाहनानां नामानि ।
- ◆ तृतीयाविभक्तिः - दण्डेन, मापिकया, लेखन्या, पुष्पेण ।
(वाक्यपत्रस्य आधारेण वाक्यानि वाचनीयानि ।)
- ◆ सह, विना ।
- ◆ अद्यतन, ह्यस्तन, श्वस्तन, पूर्वतन, इदानीन्तन
- ◆ भविष्यत्कालीनक्रियापदानां पाठनम् ।
गमिष्यति, पठिष्यति, लेखिष्यति ।(कोष्ठकस्य साहाय्येन)
- ◆ गत, आगामि ।
- ◆ गीतम् ।
- ◆ स्म ।
- ◆ अभवत् ।
- ◆ क्त्वाप्रयोगः (कोष्ठकस्य साहाय्येन) ।
- ◆ यदा - तदा ।
- ◆ बन्धुवाचकशब्दाः ।
- ◆ वेशभूषणानां नामानि ।
- ◆ वर्णाः ।
- ◆ रुचयः ।
- ◆ क्रीडा - एकश्वासेन सङ्ख्याकथनम् ।
- ◆ कथा ।
- ◆ पञ्च वाक्यानि ।
- ◆ सूचना ।
- ◆ ऐक्यमन्त्रः ।

षष्ठं दिनम्

- ◆ गीतम् ।
- ◆ पुनःस्मरणम् ।
- ◆ नूतनम् x पुरातनम्,

- ◆ बहु x किञ्चित्,
- ◆ दीर्घः x ह्रस्वः ।
- ◆ उग्रतः x वामनः ।
- ◆ स्थूलः x कृशः ।
- ◆ एतादृश, तादृश, कीदृश?
- ◆ तुमुन् (कोष्ठकस्य साहाय्येन) ।
- ◆ किन्तु ।
- ◆ निश्चयेन ।
- ◆ बहुशः / प्रायशः ।
- ◆ किल / खलु ।
- ◆ शक्नोति ।
- ◆ गीतम् ।
- ◆ विशेषणविशेष्यभावस्य अभ्यासः ।(प्रथमाविभक्तौ)
सः उत्तमः बालकः ।
सा उत्तमा बालिका ।
तत् उत्तमं पुस्तकम् ।
- ◆ इव । विनोदकणिका ।(गतवान् 'इव' अभिनयं कृतवान्!)
- ◆ अपेक्षया ।
- ◆ पशूनां नामानि ।
- ◆ अवयवानां नामानि ।
- ◆ वाक्यविलारणाभ्यासः ।
(सः मम पुस्तकं प्रातःकाले पञ्चवादने पठितवान् ।)
- ◆ इतः पूर्वम् - इतः परम् ।
- ◆ 'रामकृष्ण' सङ्ख्याक्रीडा ।
- ◆ कथा ।
- ◆ षट् वाक्यानि ।
- ◆ सूचना ।
- ◆ ऐक्यमन्त्रः ।

सप्तमं दिनम्

- ◆ गीतम् ।
- ◆ पुनःस्मरणम् ।
- ◆ क्त्वा - तुमुन् - परिवर्तनाभ्यासः ।
- ◆ बहिः x अन्तः ।
- ◆ रिक्तम् x पूर्णम् ।
- ◆ इतोऽपि ।
- ◆ इत्युक्ते ।
- ◆ अन्ते ।
- ◆ चेत् - नो चेत् ।

- ❖ गीतम् ।
- ❖ आरोग्यसम्बन्धिशब्दाः – वैद्यरोगिसम्भाषणम् ।
- ❖ प्रश्नोत्तरस्पर्धा ।
- ❖ ऋषीणां नामानि ।
- ❖ कथा - शिक्षकः एकां कथां वदति । अनन्तरं छात्रेषु एकैकः तस्याः कथायाः एकैकं वाक्यम् उक्त्वा कथां सम्पूर्णां करोति ।
- ❖ सङ्ख्या - दीर्घसङ्ख्यापाठनम् ।
- ❖ प्रश्नोत्तरम् ।
- ❖ क्रीडा - (गणद्वये नामस्मरणक्रीडा)
- ❖ कथा ।
- ❖ पुस्तकानां परिचयः ।
- ❖ सप्त वाक्यानि ।
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

अष्टमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ वारम् ।
- ❖ अतः - यतः परिवर्तनाभ्यासः ।
- ❖ यद्यपि – तथापि ।
- ❖ यत्र – तत्र ।
- ❖ कति - कियत् - एतयोः भेदज्ञापनम् ।
- ❖ यावत् – तावत् ।
- ❖ यत् – तत् ।
- ❖ यः - सः ।
- ❖ या – सा ।
- ❖ गीतम् ।
- ❖ अस्माकम् ।
- ❖ चर्चा ।
- ❖ सङ्ख्या - 'शतायुः - गतायुः' क्रीडा ।
- ❖ विनोदकणिकाकथनम् ।
- ❖ कथा ।
- ❖ अष्ट वाक्यानि ।
- ❖ समाजनिधिविषये सूचना ।
- ❖ ऐक्यमन्त्रः ।

नवमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ चित् ।
- ❖द्वयम् ।
- ❖ सङ्ख्यासु लिङ्गभेदः ।
एकः - एका - एकम्
द्वयम् - द्वयम् - द्वयम्
त्रयः - तिस्रः - त्रीणि
चत्वारः - चतस्रः - चत्वारि
- ❖ शिक्षकः - अहं वैद्यः - मम नाम सुरेशः
(छात्राः तमुद्दिश्य प्रश्नान् पृच्छेयुः ।)
- ❖ अर्थम् (समाजार्थम्, संस्कृतकार्यार्थम्...) ।
- ❖ गीतम् ।
- ❖ तव्यत् – अनीयर् ।
- ❖ अनन्त्यकथारचना ।
- ❖ सङ्ख्यान्वेषणम् (क्रीडा) ।
- ❖ छात्रैः सह प्रश्नोत्तरम् ।
- ❖ समाजनिधिविषये पुनःस्मरणम् ।
- ❖ ऐक्यमन्त्रः ।

दशमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ पत्रलेखनम् ।
- ❖ दूरवाणीसम्भाषणम् ।
- ❖ मार्गनिर्देशः – कुत्र गन्तव्यम् इत्यादि ।
- ❖ तव्यत् अभ्यासार्थम् – अद्य किं किं करणीयम् ?
- ❖ सान्दर्भिकभाषणम् –
1. प्रवासात् प्रतिनिवर्तनस्य ।
2. आपणिकस्य इत्यादि ।
- ❖ क्रीडा – सङ्ख्यायोजनम् (गणद्वये) ।
- ❖ शुभाशयाः ।
- ❖ असत्यकथनम् / कल्पनाकथनम् ।
- ❖ समारोपः (सर्वैः शिक्षार्थिभिः भारतमातुः पूजां कृत्वा निधिसमर्पणं करणीयम् ।)
- ❖ पत्राचारप्रगतशिक्षणादिविषये सूचना ।
- ❖ ऐक्यमन्त्रः ।

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-16

Course: *Kirtan Kala*

L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week

Total Credits: 01

Course objectives:

The objective of the course is to provide the students with a spiritual experience as well as its benefits to them in the form of better abilities to concentrate and develop the ability to create a peaceful mind.

Course outcome

At the end of the course, the students will be able to achieve the following:

CO1: Learn from the inspiring spiritual journey of the saints and the history of Kirtan tradition

CO2: Learn about the musical instruments used in the art of Kirtan

CO3: Develop communication skills

- कीर्तन परंपरेचा इतिहास आणि अखिल भारतातील कीर्तन परंपरांचा परिचय
- चार महिन्यात वीस संतचरित्रांचा परिचय अधिक त्याविषयी प्रवचन
- वीस संतांचा वाङ्मयीन परिचय
- प्रमुख पाच कीर्तन पद्धतींचे मांडणी तंत्र.
- पूर्वरंग - उत्तररंग सहित कीर्तनप्रक्रियेतील सर्व महत्वाचे टप्पे.
- कीर्तनासाठी आवश्यक असणारी कंठ संगीतात्मक माहिती
- ढोल, मृदंग, वीणा, तबला, पेटी या वाद्यांची ओळख.
- प्रवचनांसाठी अभ्यासग्रंथांचे मार्गदर्शन.
- वक्तृत्व कला, संभाषण कला, संवाद कौशल्य, कथाकथन यांची रहस्ये
- कीर्तनाचे अनुषंगाने संस्कृत मराठी श्लोक, सुभाषिते व प्रमाणाधार अशी ओव्या अभंगांची शिदोरी.

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS02PR0105-17/25HS02PR0206-17 Course: Introduction to German Language and culture
L: 00 Hrs, T: 0 Hr, P: 2 Hrs, Per Week Total Credits: 01

Course objective:

To help build a foundation and interest in German language so that the students can pursue the proficiency levels of the language in higher semesters.

Course outcomes:

On successful completion of the course the students will be able to achieve the following:

- CO1. Demonstrate basic knowledge about Germany, the culture and similarities/differences between India and Germany
- CO2. Learn to use simple language structures in everyday communication.
- CO3. Develop ability to write in basic German about themselves and others.
- CO4. Develop ability to read and understand beginner level texts in German.

Syllabus

List of Practicals

Practical-1: Orientation about Germany, the language, and culture

Practical-2: Vocabulary building for everyday conversations

Practical -3: Numbers, days and time

Practical-4: Introducing Oneself & Others

Practical-5: Reading Skills: Reading simple text in German language

Practical-6: Basic Verbs & Sentence Construction

Practical-7: Food & Dining, Giving Directions & Transportation

Practical-8: Writing Skills: Write basic German and practice

Recommended reading

1. German Made Easy by Diego A. Agundez
2. Teach Yourself Complete German: Learn to Read, write, Speak and Understand A new Language by Paul Coggle, Heiner Schenke
3. Netzwerk A1 by Helen Smitz, Stefanie Dengler and Paul Rusch
4. Deutsche Welle (DW) - www.dw.com/learngerman
5. BBC Languages - German - www.bbc.co.uk/languages/german
6. Goethe-Institut - www.goethe.de

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS04PR0102-1

Course Name: Adventure Sports

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week

Total Credits: 01

Course Objective:

This course introduces adventure sports, emphasizing experiential learning through participation in various activities. The course will cover the fundamentals, safety procedures, and physical and mental benefits of adventure sports. Students will engage in outdoor activities such as wall climbing, rappelling, and more, fostering a connection with nature and understanding the principles of risk management.

Course Outcome: By the end of this course, students will:

- Understand the principles and benefits of adventure sports.
- Develop basic skills in selected adventure sports.
- Learn and apply safety measures and risk management techniques.
- Foster teamwork, leadership, and problem-solving skills.

Syllabus:

- Tent pitching, knot practice session and Tent allotment
- Activities like Jumaring and Climbing
- Individual challenge like Burma bridge, ladder bridge, multi vine
- Group Task like improvise raft making and Kayaking
- Activities like Archery rifle shooting, cycle ride

Pattern of Classes: 30 Hrs. Camp (2 Days and 1 Night Camp)

Assessment Pattern:

Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0102-1 / 25HS04PR0202-1	Internal Marks - 25 Marks External Marks - 25 Marks	50
Total - 50 Marks		

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS04PR0102-2
& Obstacle Training

Course Name: Introduction to Defense Forces

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week /30 Hrs.

Total Credits: 01

Course Objective:

- Understand the Structure and Function of Defense Forces
- Familiarize with Defense Force Training and Discipline
- Learn Basic Obstacle Course Techniques
- Apply Problem-Solving and Teamwork in Obstacle Training
- Explore the Role of Obstacle Training in Defense Preparedness

Course Outcome:

Upon successful completion of the course, students should be able to:

- Describe the Structure and Functions of Defense Forces
- Demonstrate Knowledge of Defense Training Protocols
- Navigate Basic Obstacle Courses & Connect Obstacle Training to Defense Preparedness
- Collaborate and Problem-Solve in Team-Based Exercises

Syllabus:

- Knot and Hitch practice session
- Activities like Rappelling & Wall Climbing
- Burma bridge & ladder bridge
- First Aid
- Rifle Shooting
- Horse riding
- Group Task and Team building activities

Pattern of Classes: 30 Hrs Camp (2 Days and 1 Night Camp)

Assessment Pattern:

Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0102-2 / 25HS04PR0202-2	Internal Marks - 25 Marks External Marks - 25 Marks	50
Total - 50 Marks		

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS04PR0102-3 Course Name: First Aid & Disaster Management

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week

Total Credits: 01

Course Objective:

- Understand Disaster Types and Characteristics
- Learn Risk Assessment and Management
- Master Emergency Preparedness and Response
- Explore Recovery and Reconstruction
- Develop Skills in Communication and Coordination
- Understand Legal and Ethical Considerations

Course Outcome:

Upon successful completion of the disaster management course, students should be able to:

- Identify and Categorize Disasters
- Conduct Risk Assessments
- Develop Emergency Plans
- Implement Response Strategies

Syllabus:

- Basic First Aid
- Transportation of Casualty
- Injury Prevention & Cure
- Various Types of Knots & Hitches
- Various team building activities
- Fire emergencies & use of extinguishers (Optional)
- Snake Bite & Environmental emergencies.

Assessment Pattern:

Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0102-3 / 25HS04PR0202-3	Internal Marks - 25 Marks External Marks - 25 Marks	50
Total - 50 Marks		

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25HS04PR0102-4

Course Name: Basic Nutritional Course

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week

Total Credits: 01

Course Objective:

In the "Basics of Nutrition" course, students will develop a comprehensive understanding of essential nutrients and their roles in supporting overall health. They will learn to apply dietary guidelines effectively, tailoring recommendations to various age groups and health conditions. Additionally, students will cultivate the skills needed to assess and improve their own and others' eating habits for better health outcomes.

Course Outcome:

By the end of the course, students will be able to

- Accurately describe the functions of key nutrients and their impact on health,
- create balanced meal plans based on established dietary guidelines,
- critically evaluate nutrition information to distinguish between credible and misleading sources.

Syllabus:

Unit I

- Introduction to Nutrition – Define Balanced Diet, Nutrition, Optimum Nutrition, Nutrients, Concept of Health, Recommended Dietary Allowances (RDA)
- Carbohydrates (sources, functions and digestion)
- Proteins (sources, functions and digestion)
- Fats (sources, functions and digestion)
- Micronutrients (vitamins and minerals-sources, functions and digestion)

Practical I

- Display of all the foods with the help of students and while demonstrating teacher will again explain role and importance of nutrition in daily life. Deficiency will lead to chronic diseases and its prevention is very necessary for the quality of life.

Unit II

- What is Body Mass Index?
- What is Basal Metabolic Rate?
- What is Ideal Body Weight? (Male/Female)
- How to read labels on Food Packets?
- How to choose smart food and Concept of Rainbow diet, My Food Pyramid or My plate given by ICMR-NIN.

Practical II

- Calculation of Body Mass Index, Basal Metabolic Rate, Ideal Body Weight (Male/Female) with the use of self-body measurements.
- Demonstration of Rainbow diet, My Food Pyramid or My plate in a class.

Assessment Pattern:

Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0102-4 / 25HS04PR0202-4	Internal Marks – 25 Marks External Marks – 25 Marks	50
Total – 50 Marks		

Syllabus for Semester I, Bachelor of Computer Application

**Course Code: 25HS04PR0102-5
Through Yoga & Meditation**

Course Name: Stress Management

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week

Total Credits: 01

Course Objective: Mental health is one of the most important facets of human life. Academic learning has emerged as a major source of stress among young students worldwide. Promoting mental well-being among students in India is a crucial step toward achieving Sustainable Development Goal 3 (Good Health and Well-being). Stress management involves using various techniques and strategies to control stress levels, improve how you react to stressful situations. Yoga combines physical movement with deep breathing and meditation, providing a holistic approach to stress relief.

Course Outcome:

Upon successful completion of the course, students should be able to:

- Understand the basics of stress management.
- Analyze stress triggers and to manage them.
- Evaluate the responses to stressful situations.
- Apply the techniques of Yog & Meditation for stress management in day-to-day life.

Syllabus:

Unit-1

Introduction to Stress: The Meaning of Stress, types of stress: distress, eustress

Stress Management Techniques I:

Treatment 1- (Asanas): Tadasana, Trikonasana, Vrikshasana, Garudasana,, Ardha-Padamasana, Padamasana, Vajarasana, Ushtrasana, Gomukhasna,, Paschimottanasan, ,Ardha Halasana, ,Setu-Bandhanasa, Naukasana, Bhujangasana, and Dhanurasana; along with relaxing asanas

Unit-2

Spiritual approach to stress management.

Stress Management Techniques II

Treatment 2 - (Pranayam) Deep breathing, Yoga, Mindfulness meditation

Rechak, Purak, Kumbhak, Nadi Suddhi and Bhramari Pranayama.

Measuring Academic stress- It can be measure using questionnaire: Academic stress Scale (Sun .et al 2011).

Assessment Pattern:

Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0102-5 / 25HS04PR0202-5	Continuous Assessment - 25 Marks Internal Test Evaluation - 25 Marks	50
Total - 50 Marks		

Syllabus for Semester I, Bachelor of Computer Application

Course Code: 25EE07PR0105
Systems

Course Name: Day-to-Day Electrical

L: 0 Hrs. T: 0 Hrs. P: 2 Hrs. Per Week

Total Credits: 01

Course Outcomes:

After completion of the course, students will be able to

1. Understand how to measure and interpret electrical parameters of home appliances & calculate residential bills.
2. Comprehend the concept of energy star ratings and their significance.
3. Gain practical knowledge of residential wiring techniques.
4. Identify and understand the components of a residential solar PV system.
5. Understand the importance of ELCB, MCB, and fuses in electrical safety
6. Conduct market surveys to evaluate different electric two-wheelers.

Syllabus

- Identification of parameters of home appliances using the Power guard meter.
- Calculation and verification of the residential energy bill.
- Energy efficiencies of home appliances- Introduction to Star ratings: Case Study.
- Implementation of simple wiring used in residential installations.
- Identification of components of Solar Photovoltaic systems for residential consumers.
- Understanding the necessity and application of Earth Leakage Circuit Breaker (ELCB) and Miniature Circuit Breaker (MCB) and Fuse.
- Comparative study of Electric Two-Wheelers (Market Survey)
- Hands-on training in Digital meters.

Text/ Reference books:

1. "Electrical Measurement, Signal Processing, and Displays" by John G. Webster.
2. "Electrical Installation Design Guide: Calculations for Electricians and Designers" by The Institution of Engineering and Technology.
3. "Solar Photovoltaic Technology and Systems: Chetan Singh Solanki, PHI learning Pvt. Ltd.,2014
4. "Modern Wiring Practice: Design and Installation" by W. E. Steward and R. A. Beck.
5. "Electrical Safety Handbook" by John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, and Al Winfield.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25CS18TP0201

Course: Object Oriented Programming

L: 3 Hrs, P: 2 Hr, Per Week

Total Credits: 4

Course Objectives

1. To make students understand the fundamental features of an object-oriented language like Java: object classes and interfaces, exceptions, and libraries of object collections
2. Introduce students to fundamental concepts like exception handling, generics, collection classes, and streams.

Course Outcomes:

On successful completion of the course, students will be able to:

1. Understand the object-oriented programming features, classes, objects, and methods.
2. Develop efficient programs by implementing the concept of Inheritance, polymorphism exception handling.
3. Use the concept of generics, collections, and streams to develop solution to the given problem.
4. Analyze characteristics and need of design pattern in software design process.

Syllabus

Unit I:

Features of Object-Oriented Programming languages, Abstraction, Encapsulation, Inheritance, polymorphism, and late binding. Programming paradigms, Bytecode, JDK, JRE, JVM.

Concept of a class and object, ways of representing objects, access specifiers, constructors and functions.

Unit II:

Concept of overloading: Constructor Overloading, Function Overloading.

Arrays and Array of objects, Wrapper classes (Integer, Double etc.), String Class, creating packages, importing packages.

Lambda Expressions Introduction, Block, Passing Lambda expression as Argument

Unit III:

Concept of inheritance, methods of derivation, use of super keyword and final keyword in inheritance, overriding, run time polymorphism, abstract classes and methods, Interface, implementation of interface, static and non-static members.

Unit IV:

Exceptions: Types of exception, use of try-catch block, handling multiple exceptions, using finally, throw and throws clause, user-defined exceptions.

Introduction to streams, byte streams, character streams, file handling in Java, Serialization.

Unit V:

Generics: type-safety, generic class with two type parameters, bounded generics, wildcard, and generic method.

Collection classes: ArrayList, TreeSet, HashMap, Iterator, ListIterator, Collections class, Comparator, Comparable

Unit VI:

Introduction to Design Patterns, Need of Design Pattern, Classification of Design Patterns, Role of Design Pattern in Software design, Creational Patterns, Structural Design Patterns and Behavioral Patterns.

Text Books

1. Herbert Schildt; JAVA The Complete Reference; Ninth Edition, Tata McGraw- Hill Publishing Company Limited.
2. Design Patterns By Erich Gamma, Pearson Education

Reference Books

1. Herbert Schildt and Dale Skrien; Java Fundamentals A Comprehensive Introduction; Tata McGraw- Hill Education Private Ltd 2013.
2. Core Java Volume I – Fundamentals” by Cay S. Horstmann and Gary Cornell

LAB SYLLABUS

Minimum 8 practicals based on but not limited to the following topics:

Classes and Objects, Inheritance, Overloading, Polymorphism, Collections, Generics, File Handling

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25CS18TH0202

Course: Computer Architecture and Organization

L: 3 Hrs, P: 0Hr, Per Week

Total Credits: 3

Course Outcomes:

On Successful completion of course, students will be able to:

1. Understand basic components of a computer, including CPU, memories, and input/output, and their organization.
2. Apply pipelining and parallel computing concepts.
3. Perform mathematical operations on arithmetic and floating-point numbers.
4. Analyze cost performance trade off in designing memory hierarchy and instruction sets.
5. Design control unit and execute instructions.

SYLLABUS

UNIT I: Basic Structure of Computers: Functional units of computer. Instructions set architecture of a CPU- Instruction sequencing, addressing modes, and instruction set classification, subroutine & parameter passing, expanding opcode, RISC and CISC.

UNIT II: Data Representation: Signed number representations and their operations, design of Fast Adders, Multiplication- shift and add booth's Algorithm, bit-pair recoding, Integer Division- restoring and non-restoring division. Floating point numbers: representation, guard bits and rounding, arithmetic.

UNIT III: Basic Processing Unit: Bus architecture, Execution of a Complete Instruction, sequencing of control signals, Hard wired control, Micro-programmed Control.

UNIT IV: Memory System Design: Semiconductor RAM memories, Static and Dynamic Memories, ROM, Higher order memory design and Memory hierarchy, multi-module memories, Memory interleaving, Cache memory, Mapping functions.

UNIT V: Input/output Organization: I/O mapped I/O and memories mapped I/O, interrupt and interrupt handling mechanisms, vectored interrupts, synchronous and asynchronous data transfer, Bus Arbitration, Direct Memory Access.

UNIT VI: Pipelining and Parallel Computing: Basic concepts of pipelining, throughput and speedup, Introduction of Parallel Computing: SISD, MISD, SIMD, MIMD. Introduction to Higher-order Processor.

Text Books

1. V.C. Hamacher, Z.G. Vranesic and S.G. Zaky; Computer Organisation; 5th edition; McGrawHill,2002.
2. W. Stallings; Computer Organization & Architecture; PHI publication; 2001.
3. J. P. Hayes; Computer Architecture & Organization; 3rd edition; McGraw-Hill; 1998.

Reference Books

1. M Mano; Computer System and Architecture; PHI publication; 1993.
2. A.S. Tanenbaum; Structured Computer Organization; Prentice Hall of India Ltd.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25CS18PR0203

Course : Programming Workshop-II

L: 0 Hrs P: 2Hr, Per Week

Total Credits: 1

Course Outcomes

On successful completion of the course, students will be able to:

1. Design and develop dynamic web pages using JavaScript
2. Apply ES6 features to create interactive and dynamic web designs.
3. Gain proficiency in writing modern JavaScript code for web design projects

JavaScript: Introduction to JavaScript, Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects-Arrays-Built-in Objects, Handling Events in JavaScript, Form creation & validation, PHP database connectivity.

Introduction to ES6: Let and Const Declarations, Arrow Functions and Template Literals, Destructuring and Spread/Rest Operators, Classes and Modules, Exploring array methods.

Text Books:

1. JavaScript: The Complete Reference, Thomas Powell, Fritz Schneider, MGH
2. Textbook: "Exploring ES6", Axel Rauschmayer, Leanpub
3. User story mapping, Jeff Patton, O'Reilly Publication

PRACTICAL LIST

Course: COMPUTER WORKSHOP-II LAB

1. JavaScript
 - a. Conditional Statements
Write the code to output Grade "C" if entered marks are between 50-65, "B" for 66-80 and "A" for 80-90 and "A+" for above 90.
 - b. Arrays and loops
Write the code to create an array (read elements entered by user) which should allow only unique values, if there are duplicates, then keep the first occurrence and remove the duplicates.
 - c. String

Write the code to count the number of vowels in a paragraph.

d. Functions

Write a function to reverse a given number. Use this function to check whether a number is a palindrome or not.

e. Class and Object

Write a class Employee, constructor to initialize name, empid, salary, years of experience. Create operation addIncrement() to increment the salary of employees based on the years of experience.(If exp>3, increment = 10%; else 5%)

Create and initialize an array of employee objects and add Increment to each.

Use alerts, prompts and confirm boxes wherever required.

2. Event Handling using JavaScript

Design a calculator to calculate the Profit and Loss in percentage using JavaScript.

3. Form Validation using JavaScript

Design a form for registration of online exam implementing the following validation constraints:

Divide the form in three sections:

A. Personal Information:

- Name (must not have the digits or special characters)
- Email id should be valid
- Mobile number (length == 10 and must start with 7/8/9 only)
- Date of birth (should be such that $18 < \text{age} < 25$)

B. Educational information:

- X and XII marks must be mandatory
- Rest of the fields of academic details are optional

C. Payment Details:

- Card no should be valid in case of card payment and upi id should be valid in case of upi payment

4. PHP and MYSQL

Demonstrate on how to connect to a MySQL database using PHP and perform basic CRUD operations for registration of online NPTEL courses using PHP and MYSQL.

5. Destructuring and Spread/Rest Operators

- a. Write the code to display data of different vendor purchasing and selling common products using spread operator.

- b. Write the code to create an array of five different subjects and apply destructuring using rest operator to display first subject and then remaining subjects.

6. Arrow Functions and Template Literals

- a. Write the code to find Fibonacci series of n numbers using Arrow functions in ES6.
- b. Write the code for generating HTML templates for a grocery item using template literals in ES6.

7. Classes and Modules

Write the code for different gadgets available in electronic showroom using classes and modules in ES6.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25CS18TH0204

Course: Cyber Laws & Ethics in IT

L: 2 Hrs, T: 0 Hr, P: 0 Hr, Per Week

Total Credits: 2

Course Outcomes

On successful completion, of course student will able to learn:

1. To analyze the role of ethics in IT organization.
2. To identify various cyber laws with respect to legal dilemmas in the Information Technology field.
3. To interpret various intellectual property rights, Privacy, Protection issues in Information Technology field.
4. To describe the ways of precaution and prevention of Cyber Crime as well as Human Rights.

Syllabus:

UNIT I

Ethics in business world & IT professional malpractices, Introduction to firewalls, IDS System, Distortion and fabrication of information

UNIT II

Ethics of IT Organization: Contingent Workers H- IB Workers, Whistle- blowing, Protection for Whistle- Blowers, Handling Whistle- blowing situation, Digital divide.

UNIT III

Intellectual Property: Copyrights, Patents, Trade Secret Laws, Key Intellectual property issues, Plagiarism, Privacy: The right of Privacy, Protection, Key Privacy and K-Anonymity issues, Identity Theft, Consumer Profiling,

UNIT IV

Cyber laws and rights in today's digital age, Emergence of Cyberspace, Cyber Jurisprudence, Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber terrorism, cyber tort, Cyber

Defamation & hate speech, Competitive Intelligence, Cybersquatting, The Indian Information Technology Act 2000 IT Act.

Text Books:

1. George Reynolds, "Ethics in Information Technology", 5th edition, Cengage Learning
2. Hon C Graff, Cryptography and E-Commerce - A Wiley Tech Brief, Wiley Computer Publisher, 2001.

Reference Books:

1. Michael Cross, Norris L Johnson, Tony Piltzecker, Security, Shroff Publishers and Distributors Ltd.
2. Debora Johnson, "Computer Ethics", 3/e Pearson Education.
3. Sara Baase, "A Gift of Fire: Social, Legal and Ethical Issues, for Computing and the Internet," PHI Publications.
4. Chris Reed & John Angel, Computer Law, OUP, New York, (2007).
5. Dr Pramod Kr. Singh, "Laws on Cyber Crimes [Along with IT Act and Relevant Rules]" Book Enclave Jaipur India.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25HS05TP0202

Course: Basics of Quantum Computing

L: 3 Hrs, P: 2 Hr, Per Week

Total Credits: 4

Course Objectives

1. To introduce the fundamentals of quantum computing to students
2. The problem-solving approach using finite dimensional mathematics

Course Outcomes

After successful completion of the course, the students will be able to -

1. Use the basic quantum theory relating to the probabilistic behaviour of an electron in an atom.
2. Utilize the knowledge of complex vector space in the domain of quantum theory.
3. Analyse classical and quantum approach towards the quantum computation.
4. Classify deterministic and probabilistic systems and analyse quantum observations and quantum measurements.
5. Use quantum gates in building architecture and quantum algorithms.
6. Develop skills required for experimentation and verification of physics laws.
7. Utilise Mathematica software for graph plotting and for least squares fitting of the experimental data.
8. Compare the properties of real and complex matrices with reference to their use in quantum system.
9. Apply the computational methods to solve eigenvalues and eigenfunctions, tensor products.
10. Simulate classical and quantum gates.

Module 1: Basic Quantum Theory

Brief introduction about Quantum Computers and Quantum mechanics, Wave nature of Particles, Bohr's quantization condition, Heisenberg's Uncertainty principle, Wave function, probability, Schrodinger's wave equation, Operators, Electron in an infinite potential well, Eigen value and Eigen functions.

Module 2: Complex Vector Spaces

Algebra and Geometry of Complex numbers, Real and Complex Vector Spaces, definitions, properties, Abelian group, Euler's formula, Dr Moivre's formula, Matrix properties.

Module 3: Linear Algebra in Quantum Computing

Basis and Dimensions, Inner products, Hilbert Spaces, Eigenvalues and Eigenvectors, Hermitian and Unitary Matrices, Tensor Product, Applications of linear algebra in computer graphics.

Module 4: Classical and Quantum Systems

Deterministic and Probabilistic Systems, Quantum Systems, Stochastic billiard ball, Probabilistic double slit experiment with bullet and photon, Superposition of states, assembling systems, Entangled states.

Module 5: Quantum representation of systems

Dirac notations, Stern-Gerlach experiment, transition amplitude, norm of the ket, Bloch Sphere, Observables, Spin matrices, commutator operator, expectation values, variance, standard deviation, Heisenberg's uncertainty principle in matrix mechanics, measuring, dynamics, observations.

Module 6: Architecture and Algorithms

Bits and Qubits, Classical Gates and their equivalent quantum representation, Reversible Gates: CNOT, Toffoli, Fredkin, gates, outline of Pauli X,Y,Z gates, Hadamard gates, Deutsch Gate. Quantum Algorithms: Deutsch's algorithm, Grover's search algorithm. Applications of quantum computing in Cryptography, Quantum teleportation, Cybersecurity, banking, finance, advance manufacturing and artificial intelligence.

Text Book

1. Quantum computing for computer scientists, Noson S. Yanofsky, Mirco A. Mannucci, Cambridge University Press 2008
2. Introduction to Quantum Mechanics, 2nd Edition, David J. Griffiths, Prentice Hall New Jersey 1995

Reference Books

1. Quantum computing explained, David McMahon, Wiley-interscience, John Wiley & Sons, Inc. Publication 2008
2. Quantum computation and quantum information, Michael A. Nielsen and Isaac L. Chuang, Cambridge University Press 2010

The laboratory will consist of general physics experiments and computational physics practical.

1. Linear and Nonlinear data fitting by least squares fit method
2. Working with Vectors.
3. Working with Matrices: Real and Complex numbers.
4. Eigen values, Eigen functions, Properties of Inner Product and Unitary Matrices, Tensor Product.
5. Simulation of classical gates by quantum representation of the gates and inputs.
6. Introduction to IBM quantum computer.
7. Simulation of quantum gates: CNOT gate, Toffoli gate, Fredkin gate, Hadamard gate on IBM quantum computer.
8. Arithmetic operations using IBM Quantum computer.
9. Measuring scales and error estimation.
10. Verification of Ohm's law and linear least square fitting method.
11. Analyzing Wavepackets with Mathematica.
12. Measurement, analysis and fitting of non-linear IV characteristics of PN junction diode

Reference Books: (i) Lab manual prepared by Physics Department, RBU, Nagpur.
(ii) Quantum Computing: A Gentle Introduction by Textbook by Eleanor Rieffel and Wolfgang H. Polak, The MIT Press Cambridge, Massachusetts London, England, 2011.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25HS03TP0218

Course: Foundation of Probability and Statistics

L: 3 Hrs, P: 2 Hr Per Week

Total Credits: 4

Course Pre-requisite : Set Theory.

Course Objective:

The objective of this course is to expose student to understand the basic importance fundamental principles of probability, including probability distributions, random variables, basic statistical methods used for data analysis, inferential statistics, hypothesis testing, confidence intervals, and regression analysis in computer science.

Course Outcomes

On successful completion of the course, student shall be able to

1. Grasp the meaning of discrete and continuous random variables, probability distribution. Interpret the meaning of probabilities derived from distributions. This involves understanding what the calculated probabilities represent in practical terms and drawing conclusions from the results.
 2. Solve the problems related with binomial , Poisson and normal distributions.
 3. Find mean, mode, median , quartiles for analysis of data
 4. Grasp the fundamental concepts of curve fitting like regression techniques, model selection, and the use of different types of curves or functions to approximate data.
 5. Understand the fundamental concept of hypothesis testing, including the null hypothesis (H₀) and alternative hypothesis (H₁), significance levels, p-values, and the basic logic behind hypothesis testing.
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Module 1 (8 hours)

Probability of an event, addition and multiplication theorems of probability, conditional probability, independent events, Baye's theorem, random variable, types of random variable and probability distribution of a random variable.

Module 2 (8 hours)

Expectation, Variance, standard deviation, bernoulli trials, binomial distribution, poisson distribution and Normal (Gaussian) distribution.

Module 3: (8 Lectures)

Calculation of mean, median, mode of grouped and ungrouped data calculation of standard deviation, variance and mean deviation for grouped and ungrouped data, quartile, interquartile range and methods for finding outliers.

Module 4: (8 hours)

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves, correlation and regression – Rank correlation.

Module 5: (8 Lectures)

Sampling Distributions, Point and Interval Estimations, Testing of Hypothesis for single mean and proportion.

Text / Reference Books:

1. M R. Spiegel , Theory and Problems of probability and statistics :,2nded :,Schaum series
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. Maurtis Kaptein, Statistics for data science, An introduction to probability, statistics and Data Analysis, Springer 2022.
4. Jay L Devore, Probability and Statistics for Engineering and sciences, 8th edition, Cenage learning.

Lab Syllabus:

Course Objectives:

The computational Mathematics Lab course will consist of experiments demonstrating the principles of Mathematics relevant to the study of Science and Engineering. Students will show that they have learnt Laboratory skills that will enable them to properly acquire and analyze the data in the lab and draw valid conclusions. On successful completion of the course students shall be able to:

Proposed Course Outcomes:

By using open source software Students will be able to

CO1: To use mathematical software as an advance calculator. Also Create and manipulate 2D Graphs

and use these skills to effectively visualize and interpret data.

CO2: Plots 3D graphs in SageMath, and use these skills to effectively visualize and interpret data.

CO3 Find higher order derivatives and its interpretation with the help of Sagemath. and use partial

derivatives and gradients for optimizing multivariable functions.

CO4: Understand different curve fitting techniques, such as linear, polynomial, and exponential fitting and

learn how to choose the appropriate curve fitting method based on the data characteristics.

CO5: Understand how matrices are used to solve system of equations and in cryptographic algorithms.

CO6 : Understand and articulate the fundamental concepts and purposes of hypothesis testing in data analysis.

Mapping of Course outcomes (COs) with Experiments

Exp. No.	Name of Experiments	Mapped COs
1	To use mathematical software as an advance calculator and for visualization of data	CO1
2	2D Plotting	CO1
3	3D- Plotting and data visualization	CO2
4	Calculus	CO3
5	Applied optimization (Maxima, minima and Gradient descent method)	CO3
6	Curve Fitting to identify trends and patterns within dataset .	CO4
7	Application of Matrices	CO5
8	Validating Hypotheses in Data Analysis	CO6

References:

1. Paul Zimmermann, Computational Mathematics with Sagemath , siam publisher.

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25HS02TH0207

Course: Foundational Literature of Indian Civilization

L: 2 Hrs P: 0 Hr, Per Week

Total Credits: 2

Course Outcome:

At the end of the course the students will be able to achieve the following:

- 1: Understand the Indian knowledge system and its scientific approach
- 2: Get introduced to the Vedic corpus and recognize the multi-faceted nature of the knowledge contained in the Vedic corpus
- 3: Understand the salient features of the philosophical systems of the Vedic and non-Vedic schools
- 4: Develop a basic understanding of the ancient wisdom recorded in various Indian literary work

SYLLABUS

Unit I: Overview of Indian Knowledge System:

6 hours

Importance of ancient knowledge, defining IKS, IKS classification framework, Historicity of IKS, Some unique aspects of IKS.

Unit II: The Vedic corpus:

6 hours

Introduction of Vedas, four Vedas, divisions of four Vedas, six Vedangas, Distinct features of Vedic life.

Unit III: Indian Philosophical systems:

6 hours

Development and unique features, Vedic schools of philosophy, *Samkhya* and *Yoga* School of philosophy, *Nayay* and *Vaisesika* school of philosophy, *Purva-mimamsa* and *Vedanta* schools of Philosophy, Non-vedic philosophies: Jainism, Buddhism, and other approaches

Unit IV: Indian wisdom through ages:

8 hours

Panchtantras, *Purans*: contents and issues of interests, *Itihasa*: uniqueness of the two epics (Ramayan and Mahabharata), Key issues and messages from Ramayana, Mahabharata - a source of worldly wisdom; **Indian ancient Sanskrit literature**: *Kalidas*, *Vishakadutta*, *Bhavbhuti*, *Shudraka**

*any one text as decided by the course teacher

Reference material

1. B. Mahadevan, Vinayak Rajat Bhar, Nagendra Pavana R. N., "Introduction to Indian Knowledge System: Concepts and Applications" PHI, 2022
2. S.C. Chatterjee and D.M. Datta, *An introduction to Indian Philosophy*, University of Calcutta, 1984

Syllabus for Semester II, Bachelor of Computer Application

Course Code: 25HS04PR0204

Course: Health-Fitness-Wellbeing

L: 0 Hrs P: 2 Hr, Per Week

Total Credits: 1

Aim of the Course: The course aims to foster Health and wellness through Healthy and Active Lifestyle and creating awareness about the fundamentals of Physical Education, Sports, Yoga, Recreation and its effectiveness through practical experiences and hands on activities.

Objectives of the Course:

1. To impart the students with basic concepts of Sports, Yoga and Recreational activities for health and wellness.
2. To familiarize the students with health-related Exercise and evaluate their Health-related Fitness.
3. To make Overall growth & development with team spirit, social values and leadership qualities among students through various sports, games and Yogic activities.
4. To create Environment for better interaction and recreation among students as neutralizer for stress through various minor and recreational games.

Course Outcomes: On completion of the course, students will be able to:

1. Understand fundamental skills, basic principle and practices of Health, Fitness, Sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of Fitness exercises.
3. Develop Health-related fitness and Body-mind co-ordination through various fitness activities, sports, recreational games and yoga.
4. Practice Healthy & active living with reducing Sedentary Life style.

Course Content:

Unit 1:

- Warm up and Cool Down and Stretching Exercises.
- General and Specific Exercises.
- Calculation of BMI & Resting Pulse Rate.
- General and Specific exercises for strength, Speed, Agility, Cardiovascular Endurance, Flexibility and Coordination.
- Practice of Fundamental Skills of Volleyball, Table Tennis and Chess, etc.
- Knowledge and practice of the Equipment used in Health Center, Gymnasium and its application.

Unit 2:

- Yog: Standing, Sitting, Prone & Supine positions.
- Suryanamaskar.
- Pranayama, Meditation and Relaxation Techniques.
- Dietary Habits, Daily Energy Requirements
- Recreational Games.
- Practice of Fundamental Skills of Basketball, Football, Carrom, etc.
- Health related Physical Fitness Test.

Assessment Pattern: Assessment Type	Weightage in Marks	Total Marks
Practical 25HS04PR0101 (SEM I) 25HS04PR0201 (SEM II)	Internal Marks – 25 Marks External Marks – 25 Marks	50
Total – 50 Marks		

References:

1. Russell, R.P. (1994). Health and Fitness Through Physical Education. USA: Human Kinetics.
2. Uppal, A.K. (1992). Physical Fitness. New Delhi: Friends Publication.
3. AAPHERD "Health related Physical Fitness Test Manual." 1980 Published by Association drive Reston Virginia
4. Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana.
5. Dr. Devinder K. Kansal, A Textbook of Test Evaluation, Accreditation, Measurements and Standards (TEAMS 'Science)