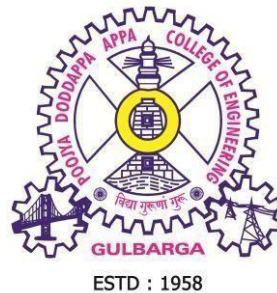


**CURRICULUM
FOR THE ACADEMIC YEAR 2022-2023**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(B.E in COMPUTER SCIENCE & DESIGN)**

B.E. IV SEMESTER



**POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING
(An autonomous college under VTU)
KALABURAGI**

About the institution: The Hyderabad Karnataka Education (HKE) society founded by Late Shri Mahadevappa Rampure, a great visionary and educationist. The HKE Society runs 46 educational institutions. Poojya DoddappaAppa College of Engineering, Gulbarga is the first institution established by the society in 1958. The college is celebrating its golden jubilee year, setting new standards in the field of education and achieving greater **heights**. The college was started with 50% central assistance and 50% state assistance, and a desire to impart quality technical education to this part of Karnataka State. The initial intake was 120 with degree offered in three branches of engineering viz, Civil, Mechanical and Electrical Engineering. Now, it houses 11 undergraduate courses, 10 post Graduate courses and 12 Research centers, established in Civil Engg., Electronics & Communication Engg, Industrial & Production Engg, Mechanical Engg, Electrical Engg., Ceramic Cement Tech., Information Science & Engg., Instrumentation Technology, Automobile Engg., Computer Sc. and Engg., Mathematics and Chemistry All the courses are affiliated to Visveswaraya Technological University, Belgaum. At present the total intake at UG level is 980 and PG level 193.

The college receives grant in aid funds from state government. A number of projects have been approved by MHRD /AICTE, Govt. of India for modernization of laboratories. KSCST, Govt. of Karnataka is providing financial assistance regularly for the student's projects.

The National Board of Accreditation, New Delhi, has accredited the College in the year 2005-08 for 09 UG Courses out of which 08 courses are accredited for three years and 01 course is accredited for five years. And second time accredited for Six Course in the year 2009-2012

Our college is one among the 14 colleges selected under TEQIP, sponsored by World Bank. It has received a grant of Rs 10.454 Crores under this scheme for its development. The institution is selected for TEQIP phase II in year 2011 for four years. Institution is receiving a grant of Rs 12.50 Crores under TEQIP Phase -II scheme for its development and selected for TEQIP-III as mentoring Institute for BIET Jhansi(UP).

Recognizing the excellent facilities, faculty, progressive outlook, high academic standards and record performance, the VTU Belgaum reposed abundant confidence in the capabilities of the College and the College was conferred Autonomous Status from the academic year 2007-08, to update its own programme and curriculum, to devise and conduct examinations, and to evaluate student's performance based on a system of continuous assessment. The academic programmes are designed and updated by a Board of Studies at the department level and Academic Council at the college level. These statutory bodies are constituted as per the guidelines of the VTU Belgaum. A separate examination section headed by a Controller of Examinations conducts the examinations.

At present the college has acquired the Academic autonomous status for both PG and UG courses from the academic year 2007-08 and it is one among the six colleges in the state of Karnataka to have autonomous status for both UG and PG courses.

One of the unique features of our college is, it is the first college in Karnataka State to start the Electronics and Communication Engineering branch way back in the year 1967, to join NIT Surathkal and IISc, Bangalore. Also, it is the only college in the state and one among the three colleges across the country, offering a course in Ceramic and Cement Technology. This is the outcome of understanding by faculty and management about the basic need of this region, keeping in view of the available raw material and existing Cement Industries.

Bharatiya Vidya Bhavan National Award for an Engineering College having Best Overall Performance for the year 2017 by ISTE (Indian Society for Technical Education). In the year 2000, the college was awarded as Best College of the year by KSCST, Bangalore in the state level students projects exhibition.

The college campus is spread over 71 acres of land on either side of Mumbai-Chennai railway track and has a sprawling complex with gardens and greenery all around.

About the department: The Computer Science and Engineering department was started in the year 1984 with an intake of 40 students for UG. The department has seen phenomenal growth and now the department has increased UG intake to 120 students and offering two Post Graduation programmes : PG (Computer Science and Engineering with an intake of 25 students) and PG(Computer Network and Engineering with an intake of 18 students). Computer Science and Design course was started from 2021 with an intake of 60 students. The department is offering research program under its recognized research center. The department is having state-of-the-art computing facilities with high speed internet facilities and laboratories. The department library provides useful resources like books and journals. The department has well qualified and experienced teaching faculty. The department has been conducting several faculty development programs and student training programs.

Vision of the Institution

To be an institute of excellence in technical education and research to serve the needs of the industry and society at local and global levels.

Mission of the Institution

- To provide a high quality educational experience for students with values and ethics that enables them to become leaders in their chosen professions.
- To explore, create and develop innovations in engineering and science through research and development activities.
- To provide beneficial service to the national and multinational industries and communities through educational, technical, and professional activities

Vision of the Department

- To become a premier department in Computer education, research and to prepare highly competent IT professionals to serve industry and society at local and global levels.

Mission of the Department

- To impart high quality professional education to become a leader in Computer Science and Engineering.
- To achieve excellence in Research for contributing to the development of the society.
- To inculcate professional and ethical behaviour to serve the industry.

Program Educational Objectives (PEO):

PEO1:	To prepare graduates with core competencies in mathematical and engineering fundamentals to solve and analyze computer science and engineering problems
PEO2:	To adapt to evolving technologies and tools for serving the society
PEO3:	To perform as team leader, effective communicator and socially responsible computer professional in multidisciplinary fields following ethical values
PEO4:	To encourage students to pursue higher studies, engage in research and to become entrepreneurs

Program Outcomes:

01. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
02. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
03. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
04. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
05. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
06. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
07. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
08. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
09. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

PSO1:	Acquire competency in hardware and software working principles to analyze and solve computing problems.
PSO2:	Design quality software to develop scientific and business applications following Software Engineering practices.
PSO3:	Apply cutting edge technologies using modern tools to find novel solutions ethically to existing problems.

SCHEME OF TEACHING FOR IV SEMESTER -2022-2023

B.E. (COMPUTER SCIENCE & DESIGN)

Sl. No.	Course and Course Code	Course Title	Teaching Hours/Week				Examination				Credits
			Theory Lecture (L)	Tutorial (T)	Practical	Self Study (S)	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	21MA41D	Applied Statistics	3	0	0	0	3	50	50	100	3
2	21CG42	Finite Automata and Formal Language	3	0	0	0	3	50	50	100	3
3	21CG43	Analysis and Design of Algorithms	3	0	0	0	3	50	50	100	3
4	21CG44	Object Oriented Programming with JAVA	3	0	0	0	3	50	50	100	3
5	21KAK45	Kannada (Samskrutika)	2	0	0	0	1.5	50	50	100	1
	21KAN45	Kannada (Balake Kannada)									
6	21CGAE46A	Organic Farming: Horticulture	2	0	0	0	2	50	50	100	2
7	21CGAE46B	MS Office Tools	0	0	2	0	3	50	50	100	1
8	21UHV46C	Universal Human Values-II	0	2	0	0	3	50	50	100	1
9	21CGL41	Analysis and Design of Algorithms Lab	0	0	2	0	3	50	50	100	1
10	21CGL42	Object Oriented Programming with JAVA Lab	0	0	2	0	3	50	50	100	1
11	21CGL43	Web Application Development Lab	0	0	2	0	3	50	50	100	1
Total			16	02	08	0	28.5	550	550	1100	20

Course Title: APPLIED STATISTICS		
Subject Code : 21MA41D	Credit : 03	CIE: 50
Number of Lecture Hours/Week	3Hrs	SEE: 50
Total Number of Lecture Hours	42	SEE Hours: 03
Prerequisites: Basic knowledge of Statistic and Probability		
<p>Course Objectives: To enable the students to obtain the knowledge of Engineering Mathematics in the following topics</p> <ol style="list-style-type: none"> 1. Probability distribution of discrete and continuous random variables 2. Joint probability distributions and discrete and continuous random variables and Morkov"s chains 3. Analyse the sample data using Large sample test, t-distribution and chi- distribution 		
MODULES		Teaching Hours
Module I		
<p>Probability distributions: Random variable (Discrete and continuous) p.d.f., c.d.f., Binomial distribution, Poisson distributions, Normal distribution and problems</p>		8 hours
Module II		
<p>Joint probability distributions: Concept of joint probability distribution, discrete and continuous random variables independent random variables problems on expectation and variance.</p>		9 hours
Module III		
<p>Markov chains: Introduction probability vectors stochastic matrices, higher transition probability. Stationary distribution of regular Markov chains and absorbing states.</p>		8 hours
Module IV		
<p>Sampling theory - I: Sampling, sampling distribution, standard error, null and alternative hypothesis, Type-I and Type-II errors, Confidence limits. Test of significance for Large sample: Test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations .</p>		9 hours
Module V		
<p>Sampling theory -II Test of significance Small samples student's t-distribution: Test for single mean, difference of means, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes and applications to real world situations. Distances in Classification: Introduction, Euclidean Distance, Manhattan Distance, Euclidean vs Manhattan Distance, Chebyshev Distance, Hamming Distance, Distance calculation in Clusters.</p>		8 hours
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module, covering all the topics from a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>		

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal, 36th Edn.
2. Engineering Mathematics by N. P. Bali and Manish Goyal. Laxmi publications, latest edition.
3. Higher Engineering Mathematics by H. K. Dass and Er. Rajnish Verma. S. Chand publishing 1st edition -2011
4. Statistical Methods Authored By Gupta S.P.Publisher: Sultan Chand & Sons. Publishing Year: 2021
5. Fundamentals of Mathematical Statistics Authored By Gupta S.C.& Kapoor V.K. Publisher: Sultan Chand & Sons.Publishing Year: 2020

REFERENCES:

1. Advanced Engineering Mathematics by E. Kreyszig, John Willey & sons 8th Edn.
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K Iyengar; Narosa publishing House.

E-Books and Online resources:

- <http://.ac.in/courses.php?disciplineID=111>
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
- <http://academicearth.org/>

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO #	Course Outcome (CO)
21MA41D	CO1	Solve problems using theoretical probability distributions
	CO2	Apply the concepts of joint probability, to find covariance, correlation, independent variables
	CO3	Apply stochastic to find the probability vectors, stochastic matrices and higher transition probability
	CO4	Analyze the sample data using Large sample tests
	CO5	Analyze the sample data using t-distribution and chi- distribution .

Course Title: FINITE AUTOMATA AND FORMAL LANGUAGE		
Subject Code : 21CG42	Credit : 3	CIE: 50
Number of Lecture Hours/Week	03 Hrs	SEE: 50
Total Number of Lecture Hours	42	SEE Hours: 03
Pre-requisites: Mathematical Foundations of Computer Science		
Course objectives:		
<ul style="list-style-type: none"> • To gain an understanding of automata theory principles • Familiarize applications of automata theory in compiler construction and text processing. 		
Modules		Teaching Hours
<p style="text-align: center;">Module-I</p> <p>Introduction to Finite Automata: Introduction to Finite Automata, The central concepts of Automata theory; Deterministic finite automata, Nondeterministic finite automata, An application of finite automata, Finite automata with Epsilon-transitions.</p>		09 Hrs
<p style="text-align: center;">Module-II</p> <p>Regular Expressions, Regular Languages and Properties: Regular expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions.</p> <p>Regular Languages and Properties: Regular languages, Proving languages not to be regular languages, Closure properties of regular languages.</p>		08 Hrs
<p style="text-align: center;">Module-III</p> <p>Properties of Regular Languages and Context Free Grammars: Decision properties of regular languages, Equivalence and minimization of automata.</p> <p>Context-Free Grammars and Languages: Context –free grammars, Parse trees, Applications, Ambiguity in grammars and Languages.</p>		08 Hrs
<p style="text-align: center;">Module-IV</p> <p>Pushdown automata: Definition of the Pushdown automata, The languages of a PDA; Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.</p> <p>Properties of context-free languages: Normal forms for CFGs, The pumping lemma for CFGs, Closure properties of CFL.</p>		09 hrs
<p style="text-align: center;">Module-V</p> <p>Introduction to Turing Machine: Problems that Computers cannot solve, The turning machine, Programming techniques for Turning Machines, Extensions to the basic Turning Machines, Turing Machine and Computers.</p> <p>Undecideability: A Language that is not recursively enumerable, An Undecidable problem that is RE, Post's Correspondence problem, Other undecidable problems.</p>		08Hrs

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module, covering all the topics from a module.

The students will have to answer 5 full questions, selecting one full question from each module.

Text books:

1. Introduction to Automata Theory, Languages and Computation – John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman., 3rd Edition, Pearson education, 2007.

Reference Books:

1. Raymond Greenlaw, H. James Hoove, Morgan Kaufmann, Fundamentals of the Theory of Computation: Principles and Practice –, 1998.
2. John C Martin, Introduction to Languages and Automata Theory –3rd Edition, Tata McGraw-Hill, 2007.
3. Daniel I.A. Cohen, Introduction to Computer Theory –2nd Edition, John Wiley & Sons, 2004.
4. Thomas A. Sudkamp, An Introduction to the Theory of Computer Science, Languages and Machines –3rd Edition, Pearson Education, 2006.

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO #	Course Outcome (CO)
21CG42	CO1	Design Deterministic and non Deterministic finite automata for a Given language and identify related applications in text processing.
	CO2	Construct Regular expressions for given language and describe properties of regular language.
	CO3	Develop Context Free Grammar and illustrate with its applications
	CO4	Design PDA, discuss equivalence of CFG and PDA and explain properties of Context Free Languages.
	CO5	Illustrate Turing machine concepts and its variants and the notion of undecidability.

Course Title: ANALYSIS AND DESIGN OF ALGORITHMS		
Subject Code : 21CG43	Credit : 3	CIE: 50
Number of Lecture Hours/Week	03 Hrs	SEE: 50
Total Number of Lecture Hours	42	SEE Hours: 03
Pre-requisites: Data structures using C.		
Course objectives: <ul style="list-style-type: none"> Analyze the asymptotic performance of the algorithms in time and space domain. Introduce various algorithm design techniques. 		
Modules		Teaching Hours
Module-I		08 Hrs
Introduction: Algorithm, Fundamentals of Algorithmic Problem Solving, Important problem Types, Fundamental Data Structures, Fundamentals of the Analysis of Algorithm Efficiency, Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical analysis of Non-recursive and Recursive Algorithms, Examples- Fibonacci Numbers, empirical analysis of algorithms, Algorithm visualizations.		
Module- II		09 Hrs
Brute Force: Introduction, Selection sort, Bubble Sort, Sequential search and Brute-Force String Matching, Exhaustive Search, Depth first search and Breadth First search. Decrease & Conquer : Introduction, Insertion Sort, Topological Sorting, Algorithms for Generating Combinatorial objects, Decrease by a constant factor Algorithms: Binary Search.		
Module-III		09 Hrs
Divide & Conquer : Introduction, Merge Sort, Quick Sort, Binary tree traversals & related properties, Multiplication of large integers & Strassen's Matrix Multiplication. Transform & Conquer : Introduction , Presorting, Balanced Search Trees, 2-3 Trees, Heaps and Heap Sort, Problem Reduction, Space & Time Tradeoffs : Sorting by Counting, Input Enhancement in String matching , Hashing.		
Module-IV		08 Hrs
Dynamic Programming: Introduction, Three basic examples, The Knapsack Problem and Memory Functions, Optimal binary search trees, Warshall's and Floyd's Algorithm. Greedy Techniques: Introduction, Minimum Spanning Tree, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm, Huffman trees and codes .		

Module- V		
<p>Limitations of Algorithms Power: Introduction, Lower- Bound Arguments, Decision Trees, P, NP, and NP – Complete Problems.</p> <p>Coping with the limitations of Algorithm Power: Backtracking, n-Queen’s problem, Hamiltonian circuit problem, Subset problem, General remarks. Branch and Bound : The assignment problem , Knapsack problem, Travelling sales man problem.</p>		08 Hrs
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module, covering all the topics from a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>		
<p>The question paper will have ten questions. There will be 2 questions from each module, covering all the topics from a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>		
<p>Text books:</p> <ol style="list-style-type: none"> 1. Anany Levitin, “Introduction to the Design & Analysis of Algorithm “, 3rd Edition, Pearson Edition, 2017. 		
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, “Introduction Algorithm”, 4th Edition, PHI, 2022. 2. Horowitz E, Sahni S., Rajasekaran S., “Computer Algorithms”, 2nd Edition, Galgotia Publications, 2008. 		
<p>Course outcomes: On completion of the course, the student will have the ability to:</p>		
Course outcome	CO #	Course Outcome (CO)
21CG43	CO1	Explain fundamental ideas used for designing and analyzing Algorithms.
	CO2	Demonstrate Brute Force, Decrease & Conquer techniques and analyze the performance of algorithms.
	CO3	Demonstrate design of Divide-and-Conquer ,Transform & Conquer algorithms and their efficiencies.
	CO4	Apply Dynamic Programming and Greedy Techniques to solve various graph problems efficiently.
	CO5	Describe Limitations of algorithms power and illustrate Backtracking, Branch-and-Bound algorithms to solve recursive and computational problems.

Course Title: OBJECT ORIENTED PROGRAMMING WITH JAVA		
Subject Code : 21CG44	Credit : 03	CIE: 50
Number of Lecture Hours/Week	03 Hrs	SEE: 50
Total Number of Lecture Hours	42	SEE Hours: 03
Prerequisites: Concepts of C- Programming		
Course Objectives: Learn the Java Programming to develop applications, creating GUI with applets, and web applications using JDBC		
MODULES		Teaching Hours
Module I		09 Hrs
<p>Object-Oriented Programming Paradigm– New programming paradigm, OOPs a new paradigm, Evolution of programming Paradigms, Structured Versus Object- Oriented Development, Objects, Classes, Multiple views of same objects, Encapsulation and data abstraction, Inheritance, Delegation- Object composition, Polymorphism.</p> <p>Introducing Data Types and Operators: Data types , Java Primitive Types , Literals, A Closer Look at Variables, The Scope and Lifetime of Variables, Operators, Arithmetic Operators, Relational and Logical Operators, Short- Circuit Logical Operators, The Assignment Operator, Shorthand Assignments, Type Conversion in Assignments, Using a Cast, Operator Precedence, Expressions.</p> <p>String Handling- String Fundamentals, The String Constructors, Three String-Related Language Features, The Length() Method, Obtaining the Characters within a String, String Comparison, Using indexOf() and last IndexOf(), Changing the Case of Characters Within a String.</p>		
Module II		09Hrs
<p>More Data Types and Operators – Arrays, Multidimensional Arrays, Alternative Array Declaration Syntax, Assigning Array References, Using the Length Member, The For-Each Style for Loop, Strings, The Bitwise Operators.</p> <p>Introducing Classes, Objects, and Methods-Class Fundamentals, How Objects are created, Reference Variables and Assignment, Methods, Returning from a Method, Returning a value, Using Parameters, Constructors, Parameterized Constructors, The new Operator Revisited, Garbage Collection and Finalizes, The this Keyword.</p> <p>A Closer Look at Methods and Classes - Controlling Access to Class Members, Pass Objects to Methods, How Arguments are passed, Returning Objects, Method Overloading, Overloading Constructors, Recursion, Understanding Static, Introducing Nested and Inner Classes, Varargs</p>		

<p align="center">Module III</p> <p>Inheritance- : Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call Superclass constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, When are Constructors Executed, Superclass References and Subclass Objects, Method Overriding, Overridden Methods support polymorphism, Using Abstract Classes, Using final, The Object Class,.</p> <p>Interfaces: Interface Fundamentals, Creating an Interface, Implementing an Interface, Using Interface References Implementing Multiple Interfaces, Constants in Interfaces, Interfaces can be extended, Nested Interfaces, Final Thoughts on Interfaces.</p> <p>Packages: Packages: Package Fundamentals, Packages and Member Access , Importing Packages, Static Import.</p>	<p>08 Hrs</p>
<p align="center">Module IV</p> <p>Exception Handling :The Exception Hierarchy, Exception Handling Fundamentals, The Consequences of an Uncaught Exception, Exceptions Enable you to handle errors gracefully, using Multiple catch clauses, Catching subclass Exceptions, try blocks can be nested, Throwing an Exception, A Closer look at Throwable, using finally, using throws, Java’s Built-in Exception, New Exception features added by JDK 7, Creating Exception Subclasses.</p> <p>Multithreaded Programming: Multithreading fundamentals, The Thread Class and Runnable Interface, CreatingThread, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, using Synchronization Methods, The Synchronized Statement, Thread Communication using notify (), wait() and notify All(), suspending, Resuming and stopping Threads.</p>	<p>08 Hrs</p>
<p align="center">Module V</p> <p>Applets: Applet basics, A complete Applet Skeleton, Applet Initialization and Termination, A key Aspect of an Applet Architecture, Requesting Repainting, using the status window, Passing parameters to Applets.</p> <p>Event Handling- Two Event Handling Mechanisms.</p> <p>The Delegation Event Model- Events: Event Sources, Event Listeners.</p> <p>Event Classes: The ActionEvent Class, The AdjustmentEvent Class, The Component EventClass, TheContainerEventClass,TheFocusEventClass,TheInputEvent Class, The ItemEvent Class,The KeyEvent Class, The MouseEvent Class, The MouseWheelEvent Class, The TextEventClass,TheWindowEvent Class.</p> <p>Using the Delegation Event Model- Handling Mouse Events, Handling KeyboardEvents, Adapter Classes, Inner Classes, Anonymous Inner Classes.</p> <p>JDBC-ODBC Connectivity: Talking to Database, Immediate Solutions, Essential JDBC program, using prepared Statement Object, Interactive SQL tool. JDBC in Action Result sets, Batch updates, Mapping, Basic JDBC data types, Advanced JDBC data types, immediate solutions.</p>	<p>08 Hrs</p>
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module, covering all the topics from a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	

Text Books:

1. Mastering C++, K R Venugopal, Rajkumar, T Ravishankar , 2012 Tata McGraw hill education private limited
2. Herbert Schildt , The Complete Reference, JAVA 7th/9th Edition, Tata McGraw Hill, 2013.
3. Java 6 Programming Black Book, Dreamtech Press. 2012

Reference Books:

1. Java Fundamentals: A comprehensive Introduction by Herbert Schildt, Dale Skrien. Tata McGraw Hill Edition 2013.
2. Stephanie Bodoff et al: The J2EE Tutorial, 2nd Edition, Pearson Education, 2004.
3. Uttam K Roy, Advanced JAVA programming, Oxford University press, 2015.

Course Code	CO #	Course Outcome (CO)
21CG44	CO1	Understand the concepts of Object Oriented Programming and apply the concepts of programming and implement programs using Java Constructs.
	CO2	Create classes and demonstrate object oriented programming concepts.
	CO3	Demonstrate inheritance, interfaces and Packages .
	CO4	Illustrate multithreading code for concurrency and run-time errors using exceptionHandling mechanism.
	CO5	Develop GUI application program using Applet , event handling and database and design web application using JDBC -ODBC connectivity

Course Title: SAMSKRUTHIKA KANNADA		
Subject Code : 21KAK45	Credit : 01	CIE: 50
Number of Lecture Hours/Week	02 Hrs	SEE: 50
Total Number of Lecture Hours	28 Hrs	SEE Hours: 1 Hrs 30Min

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಪುಸ್ತಕ

(ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)

(ಕನ್ನಡಿಗರಿಗಾಗಿ - for Kannadigas - Common to all branches)

[As per Outcome Based Education (OBE) and Choice Based Credit System (CBCS) scheme]

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

- ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡದ ಜೊತೆಗೆ ಕ್ರಿಯಾತ್ಮಕ ಕನ್ನಡವನ್ನು, ಕನ್ನಡ ಸಾಹಿತ್ಯ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ನಾಡು ನುಡಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ಕನ್ನಡದಲ್ಲಿ ತಾಂತ್ರಿಕ ವಿಜ್ಞಾನಗಳ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಹಲವಾರು ವಿಷಯಗಳನ್ನು ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಆಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಪರಿವಿಡಿ

ಭಾಗ - ಒಂದು ಲೇಖನಗಳು

ಕನ್ನಡ ನಾಡು, ನುಡಿ ಮತ್ತು ಸಂಸ್ಕೃತಿಗೆ ಸಂಬಂಧಿಸಿದ ಲೇಖನಗಳು

೧. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ : ಹಂಪ ನಾಗರಾಜಯ್ಯ

೨. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ

೩. ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ *

ಭಾಗ - ಎರಡು

ಕಾವ್ಯ ಭಾಗ (ಆಧುನಿಕ ಪೂರ್ವ)

೪. ಪಚನಗಳು : ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ, ಅಲ್ಲಮಪ್ರಭು, ಆಯ್ಯಕ್ಕಿ ಮಾರಯ್ಯ,

ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಆಯ್ಯಕ್ಕಿ ಲಕ್ಕಮ್ಮ.

೫. ಕೀರ್ತನೆಗಳು : ಅದರಿದೇನು ಫಲ ಇದರಿದೇನು ಫಲ - ಪುರಂದರದಾಸ

ತಲ್ಲಣಿಸಿದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೆ - ಕನಕದಾಸ

೬. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಷರೀಫ

ಶಿವಯೋಗಿ - ಬಾಲಲೀಲಾ ಮಹಾಂತ ಶಿವಯೋಗಿ

೭. ಜನಪದ ಗೀತೆ : ಬೀಸುವ ಪದ, ಬಡವರಿಗೆ ಸಾವ ಕೊಡಬೇಡ

ಭಾಗ - ಮೂರು

ಕಾವ್ಯ ಭಾಗ (ಆಧುನಿಕ)

೮. ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ : ಡಿ.ವಿ.ಜಿ.
೯. ಕುರುಡು ಕಾಂಚಾಣಾ : ದ.ರಾ. ಬೇಂದ್ರೆ
೧೦. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪು
೧೧. ಹೆಂಡತಿಯ ಕಾಗದ : ಕೆ.ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ
೧೨. ಮಬ್ಬಿನಿಂದ ಮಬ್ಬಿಗೆ : ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ
೧೩. ಆ ಮರ ಈ ಮರ : ಚಂದ್ರಶೇಖರ ಕಂಬಾರ
೧೪. ಚೋಮನ ಮಕ್ಕಳ ಹಾಡು : ಸಿದ್ದಲಿಂಗಯ್ಯ

ಭಾಗ - ನಾಲ್ಕು

ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿ ಪರಿಚಯ, ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ

೧೫. ಡಾ. ಸರ್ ಎಂ ವಿಶ್ವೇಶ್ವರಯ್ಯ - ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ : ಎ ಎನ್ ಮೂರ್ತಿರಾವ್
೧೬. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ
೧೭. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಚಿ. ಬೋರಲಿಂಗಯ್ಯ

ಭಾಗ - ಐದು

ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ

೧೮. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ
೧೯. 'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳು ಮತ್ತು ಕನ್ನಡದ ಟೈಪಿಂಗ್*
೨೦. ಕನ್ನಡ - ಕಂಪ್ಯೂಟರ್ ಶಬ್ದಕೋಶ*
೨೧. ತಾಂತ್ರಿಕ ಪದಕೋಶ : ತಾಂತ್ರಿಕ ಹಾಗೂ ಪಾರಿಭಾಷಿಕ ಕನ್ನಡ ಪದಗಳು*
* (ಅಧ್ಯಾಯ 3, 19, 20 ಮತ್ತು 21 ಇವುಗಳ ವಿತಾವಿ ಯದಿಂದ ಪ್ರಕಟಿತ " ಆಡಳಿತ ಕನ್ನಡ " ಪುಸ್ತಕದಿಂದ ಆಯ್ದ ಲೇಖನಗಳು - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ.



Course Title: BALAKE KANNADA		
Subject Code : 21KAN45	Credit : 01	CIE: 50
Number of Lecture Hours/Week	02 Hrs	SEE: 50
Total Number of Lecture Hours	28 Hrs	SEE Hours: 1 Hrs 30Min

Course Learning Objectives:

The course will enable the non Kannadiga students to understand, speak, read and write Kannada language and communicate (converse) in Kannada language in their daily life with kannada speakers.

Table of Contents

Introduction to the Book
Necessity of learning a local language:
Tips to learn the language with easy methods.
Easy learning of a Kannada Language: A few tips
Hints for correct and polite conversation
Instructions to Teachers for Listening and Speaking Activities
Key to Transcription
Instructions to Teachers

Part – I Lessons to teach and Learn Kannada Language

-
- Lesson – 1 ವೈಯಕ್ತಿಕ, ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತ ಸಾರ್ವನಾಮಗಳು ಮತ್ತು ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು - Personal Pronouns, Possessive Forms, Interrogative words
- Lesson – 2 ನಾಮಪದಗಳ ಸಂಬಂಧಾರ್ಥಕ ರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಸಂಬಂಧವಾಚಕ ನಾಮಪದಗಳು - Possessive forms of nouns, dubitive question and Relative nouns
- Lesson – 3 ಗುಣ, ಪರಿಮಾಣ ಮತ್ತು ವರ್ಣಬಣ್ಣ ವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು
Qualitative, Quantitative and Colour Adjectives, Numerals
-
- Lesson – 4 ಕಾರಕ ರೂಪಗಳು ಮತ್ತು ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು – ಸಪ್ತಮಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ – (ಆ, ಅದು, ಅವು, ಅಲ್ಲಿ) Predictive Forms, Locative Case
- Lesson – 5 ಚತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯದ ಬಳಕೆ ಮತ್ತು ಸಂಖ್ಯಾವಾಚಕಗಳು – Dative Cases, and Numerals
- Lesson – 6 ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳು ಮತ್ತು ಬಹುವಚನ ನಾಮರೂಪಗಳು - Ordinal numerals

- and Plural markers
- Lesson – 7 ನ್ಯೂನ / ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾಪದಗಳು ಮತ್ತು ವರ್ಣ ಗುಣವಾಚಕಗಳು
Defective / Negative Verbs and Colour Adjectives
- Lesson – 8 ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹ ಮತ್ತು ಒತ್ತಾಯ ಆರ್ಥರೂಪ
ಪದಗಳು ಮತ್ತು ವಾಕ್ಯಗಳು - Permission, Commands, encouraging
and Urging words (Imperative words and sentences)
- Lesson – 9 ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು
ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು
Accusative Cases and Potential Forms used in General Communication
- Lesson – 10 “ಇರು ಮತ್ತು ಇರಲ್ಲ” ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು
ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು
Helping Verbs “iru and iralla”, Corresponding Future and
Negation Verbs
- Lesson – 11 ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ
ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ
Comparative, Relationship, Identification and Negation Words
- Lesson – 12 ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು
Different types of forms of Tense, Time and Verbs
- Lesson – 13 ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ
ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ
Formation of Past, Future and Present Tense Sentences with
Verb Forms
- Lesson – 14 ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮತ್ತು ರಾಜ್ಯದ ಬಗ್ಗೆ ಕುರಿತಾದ ಇತರೆ ಮಾಹಿತಿಗಳು
Karnataka State and General Information about the State
- Lesson – 15 ಕನ್ನಡ ಭಾಷೆ ಮತ್ತು ಸಾಹಿತ್ಯ -
Kannada Language and Literature
- Lesson – 16 ಭಾಷೆ ಕಲಿಯಲು ಏನನ್ನು ಮಾಡಬೇಕು ಮತ್ತು ಮಾಡಬಾರದು
Do's and Don'ts in Learning a Language
- Lesson – 17 PART - II
Kannada Language Script Part – 1
- Lesson – 18 PART - III
Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ
ಪದಗಳು - Kannada Words in Conversation

Course Title: Biology for Engineers (Ability Enhancement Course)		
Subject Code: 21CSAE46A	Credits : 2	CIE: 50
Number of Lecture Hours/Week	2 Hours	SEE: 50
Total Number of Lecture Hours	28	SEE Hours: 03
Prerequisites: Basic Science		
Course Objectives:		
<ul style="list-style-type: none"> ➤ To familiarize the students with the basic biological concepts and their engineering applications. ➤ To enable the students with an understanding of biodesign principles to create novel devices and structures. ➤ To provide the students an appreciation of how biological systems can be re-designed as substitute products for natural systems. ➤ To motivate the students develop the interdisciplinary vision of biological engineering. 		
Modules		Teaching Hours
Module - I		
BIOMOLECULES AND THEIR APPLICATIONS: Carbohydrates (cellulose-based water filters, PHA and PLA as bioplastics), Nucleic acids (DNA Vaccine for Rabies and RNA vaccines for Covid19, Forensics – DNA fingerprinting), Proteins (Proteins as food – whey protein and meat analogs, Plant based proteins), lipids (biodiesel, cleaning agents/detergents), Enzymes (glucose-oxidase in biosensors, lignolytic enzyme in bio-bleaching).		06 Hrs
Module – II		
HUMAN ORGAN SYSTEMS AND BIO DESIGNS – 1: Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson’s disease).Eye as a Camera system (architecture of rod and cone cells, optical corrections, cataract, lens materials, bionic eye).Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons for blockages of blood vessels, design of stents, pace makers, defibrillators).		06 Hrs
Module –III		
HUMAN ORGAN SYSTEMS AND BIO-DESIGNS – 2: Lungs as purification system (architecture, gas exchange mechanisms, spirometry, abnormal lung physiology - COPD, Ventilators, Heart-lung machine).Kidney as a filtration system (architecture, mechanism of filtration, CKD, dialysis systems). Muscular and Skeletal Systems as scaffolds (architecture, mechanisms, bioengineering solutions for muscular dystrophy and osteoporosis).		06 Hrs
Module -IV		
NATURE-BIOINSPIRED MATERIALS AND MECHANISMS (QUALITATIVE): Echolocation (ultrasonography, sonars), Photosynthesis (photovoltaic cells, bionic leaf). Bird flying (GPS and aircrafts), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Plant burrs (Velcro), Shark skin (Friction reducing swim suits), Kingfisher beak (Bullet train). Human Blood substitutes - hemoglobin-based oxygen carriers (HBOCs) and perfluorocarbons (PFCs).		05 Hrs

Module - V		
<p>TRENDS IN BIOENGINEERING: Bioprinting techniques and materials, 3D printing of ear, bone and skin. 3D printed foods. Electrical tongue and electrical nose in food science, DNA origami and Biocomputing, Bioimaging and Artificial Intelligence for disease diagnosis. Self- healing Bioconcrete (based on bacillus spores, calcium lactate nutrients and biomineralization processes) and Bioremediation and Biomining via microbial surface adsorption (removal of heavy metals like Lead, Cadmium, Mercury, Arsenic).</p>		05 Hrs
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module, covering all the topics from a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>		
<p>Suggested Learning Resources:</p> <ul style="list-style-type: none"> • Human Physiology, Stuart Fox, Krista Rompolski, McGraw-Hill eBook. 16th Edition, 2022 • Biology for Engineers, Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., Tata McGraw-Hill, New Delhi, 2012. • Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011 • Biomedical Instrumentation, Leslie Cromwell, Prentice Hall 2011. • Biology for Engineers, Sohini Singh and Tanu Allen, Vayu Education of India, New Delhi, 2014. • Biomimetics: Nature-Based Innovation, Yoseph Bar-Cohen, 1st edition, 2012, CRC Press. • Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies, D. Floreano and C. Mattiussi, MIT Press, 2008. • Bioremediation of heavy metals: bacterial participation, by C R Sunilkumar, N Geetha A C Udayashankar Lambert Academic Publishing, 2019. • 3D Bioprinting: Fundamentals, Principles and Applications by Ibrahim Ozbolat, Academic Press, 2016. • Electronic Noses and Tongues in Food Science, Maria Rodriguez Mende, Academic Press, 2016 • Blood Substitutes, Robert Winslow, Elsevier, 2005 		
<p>Web links and Video Lectures (e-Resources):</p> <ul style="list-style-type: none"> • VTU EDUSAT / SWAYAM / NPTEL / MOOCS / Coursera / MIT-open learning resource • https://nptel.ac.in/courses/121106008 • https://freevideolectures.com/course/4877/nptel-biology-engineers-other-non-biologists • https://ocw.mit.edu/courses/20-020-introduction-to-biological-engineering-design-spring-2009 • https://ocw.mit.edu/courses/20-010j-introduction-to-bioengineering-be-010j-spring-2006 • https://www.coursera.org/courses?query=biology • https://onlinecourses.nptel.ac.in/noc19_ge31/preview • https://www.classcentral.com/subject/biology • https://www.futurelearn.com/courses/biology-basic-concepts 		
<p>Course outcomes: On completion of the course, the student will have the ability to:</p>		
Course Code	CO #	Course Outcome (CO)
21CSAE46A	CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
	CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
	CO3	Corroborate the concepts of biomimetics for specific requirements.
	CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems
	CO5	Understand the Trends of Bioengineering

Course Title : MS Office Tools (Ability Enhancement Courses)		
Subject Code 21CGAE46B	Credit : 1	CIE: 50
Number of Practical Hours/Week	2 Hours	SEE:50
Prerequisites: NIL		
Course Objectives: To enable the students to study MS Office and to enrich the practical knowledge in MS Office.		
LIST OF EXPERIMENTS		
<ul style="list-style-type: none"> • MS Word Introduction to MS Word, Starting word – Creating a Document – Saving and Printing a document – Move and Copy Text – Smart Cut and Paste – Quickly Opening Recently Used Files – Copying Text to Another File – Formatting Text – Using Bullets and Numbering in Paragraphs – Finding Text – Replace Command – Checking Spelling and Grammar – Using Auto Correct to Automatically Fix Typing Errors . • Enhancing a Document – Page Setup – Inserting Page Breaks – Looking at a Document in Different Views – Adding Borders and Shading to Paragraphs – Using Headers and Footers in the Document – Print Preview – Print Options – Creating Tables – Formatting a Table – Using Table Auto format to Format a Table – Calculations in a Table – Using Mail Merge. • Introduction to Worksheet and MS Excel – Getting Started with Excel – Editing Cells and using Commands and Functions – Excel Functions – Range – Moving and Copying, Inserting and Deleting Rows and Columns – Formatting a Worksheet – Formatting Numbers. • Creating Charts – Resizing and Moving the Chart – Changing the Chart Type – Controlling the Appearance of a Chart – Updating, Modifying and Deleting a Chart – Previewing and Printing Charts – Using Date and Time in a Worksheet – Naming Ranges and Using Statistical, Math functions. • Power Point – Creating a Presentation – Power Point Views – Running a Slide Show – Printing a Presentation. 		
Question paper pattern:		
Note : For SEE, students will be asked to execute experiments from the above list		
Text Book: R K Taxali, PC Software for Windows 98 Made Simple, 2015, McGraw Hill .		
Reference Books: 1. Jodi Davenport, Critch Greaves, Michael Groh and Eruce Hall berg, Inside Microsoft Office Professional , 1994, New Riders Publications. 2. Cloria Madumere, 3 – IN – 1 Microsoft Word, Powerpoint and Excel 2010, First Edition 2016, Create space Independent Publishing Platform Education Pvt. Ltd.		
Course outcomes: On completion of the course, the student will have the ability to:		
Course Code	CO #	Course Outcome (CO)
21CGAE46B	CO1	Perform basic editing functions, formatting text, copy and moving objects and text.

	CO2	Learn the formatting skills on paragraphs, tables, lists, and pages.
	CO3	Demonstrate the basic mechanics and navigation of an Excel spreadsheet.
	CO4	Understand the need and use of using Excel templates.
	CO5	Learn to modify presentation themes., formatting techniques and presentation styles

Course Title : UNIVERSAL HUMAN VALUES-II			
Course Code	21UHV46C	Credits:1	CIE: 50
Number of Lecture Hours/Week	2hrs (Tutorial)	SEE: 50	
Total Number of Theory Hours	14 hours	SEE Hours: 02	
Course Objectives:			
<ol style="list-style-type: none"> To facilitate the students to understand harmony at all the levels of human living, and live accordingly. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life. 			
Modules			Teaching Hours
Module I			3hrs
Implications Of The Right Understanding: Providing The Basis For Universal Human Values And Ethical Human Conduct- Value In Different Dimensions Of Humanliving, Universal Values Naturally Emerging From The Right Understanding, Defintiveness Of Ethical Human Conduct, Identification Of <i>Svatva</i> Leading To <i>Svatantrata And Svarajya</i> , Development Of Human Consciousness, Implications Of Value-Based Living.			
Module II			3hrs
Basis For The Holistic Alternative Towards Universal Human Order: Identification Of Comprehensive Human Goal, Vision For The Holistic Alternative, Basis For Humanistic Education And Humanistic Constitution, Universal Human Order And Its Implications.			
Module III			3hrs
Professional Ethics In The Light Of Right Understanding: Profession-In The Light Of Comprehensive Human God, Ensuring Competence In Professional Ethics, Issues In Professional Ethics-The Current Scenario, Inherent Contradictions And Dilemmas And Their Resolutions.			
Module IV			3hrs
Vision For Holistic Technologies, Production Systems And Management Models: The Holistic Criteria For Evaluation, A Critical Appraisal Of The Prevailing Systems, Learning From The Systems In Nature And Traditional Practices, Holistic Technologies And Systems- Typical Case Studies.			
Module V			2hrs
Journey Towards the Holistic Alternative- The Road Ahead: Appreciating The Need For Self-Exploration, Facilitating The Understanding Of Harmony At Various Levels, Steps For Evaluation At The Individual Level, Steps For Transition At The Level Of Family, Society And Profession, Promoting Mass Awareness And Moving Towards Humanistic Education, Evolving Holistic Models Of Living, Amending Policies, Programs And Social Systems In Tune With Comprehensive Human Goal, Is The Transition Too Difficult?, Concluding Remarks.			
Text Books:			
<ol style="list-style-type: none"> The Text Book 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. The teacher’s manual R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010 			
Reference Books:			
<ol style="list-style-type: none"> B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008. 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.

Question paper pattern:

1. The question paper will have 30% of MCQ questions covering the entire syllabus, students need to answer all the questions.
2. 70% of descriptive questions consist of 2 questions from each module of 12 marks each; students need to answer FIVE full questions, selecting ONE full question from each module.

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO	Course Outcome (CO)
21UHV46C	CO1	Visualize the co-relation between lack of human values and the prevailing problems.
	CO2	Visualize tangible steps and a roadmap for moving in the cherished direction.
	CO3	Visualize an appropriate utilization of the knowledge in their respective streams to ensure mutually enriching and sustainable systems.
	CO4	Evaluate the course and the transformation achieved in this process.
	CO5	Make use of this understanding for moving towards happy and prosperous life including an ethical conduct of their profession.

Course Title: ANALYSIS AND DESIGN OF ALGORITHMS LAB		
Subject Code : 21CGL41	Credits : 1	CIE: 50
Number of Practical Hours/Week	2 Hrs	SEE: 50
		SEE Hours: 03
Prerequisite: C Language		
Corse Objectives : To enable the students for <ul style="list-style-type: none"> • Learn different searching and sorting techniques. • Gain knowledge of binary tree principles. • Understand the different algorithms to solve the problems. 		
LIST OF PROGRAMS		
Using C / C++		
1. Write a C Program to implement Recursive Binary search and linear search and determine the time required to search an element.		
2. Write a C Program to Sort a given set of elements using Selection sort and determine the time required to sort elements.		
3. Write a C Program to sort a given set of elements using Merge sort method and determine the time required to sort the elements.		
4. Write a C Program to Sort a given set of elements using Quick sort method and determine the time required sort the elements.		
5. Write a C Program to Sort a given set of elements using Insertion sort and determine the time required to sort elements.		
6. Write a C Program to Check whether a given graph is connected or not using DFS method.		
7. Write a C Program to Print all the nodes reachable from a given starting node in a digraph using BFS method.		
8. Write a C Program to Sort a given set of elements using the Heap sort method and determine the time required to sort the elements.		
9. Write a C Program to Implement Horspool algorithm for String Matching.		
10. Write a C Program to Implement Floyd’s algorithm for the All-Pairs Shortest-paths.		
11. Write a C Program to implement 0/1 Knapsack problem using dynamic programming problem.		

12. Write a C Program to Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
13. Write a C Program to Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
14. Write a C Program to Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.
15. Write a C Program to Implement N Queen's problem using Back Tracking.

Question paper pattern:

Note : For SEE, students will be asked to execute two programs, selecting one program from each part.

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO #	Course Outcome (CO)
21CGL41	CO1	Apply the knowledge of Divide-and-Conquer techniques for different searching and sorting problems using recursive method and find the time complexity of algorithms.
	CO2	Demonstrate Decrease-and-Conquer techniques for sorting, solving graph problems etc.
	CO3	Design and implement algorithms for solving the graph problems by using Greedy techniques.
	CO4	Demonstrate the concepts of Dynamic Programming techniques for subset sum problems.
	CO5	Illustrate the Back Tracking Techniques for N-Queen's problems.

Course Title: OBJECT ORIENTED PROGRAMMING WITH JAVA LAB		
Subject Code : 21CGL42	Credit : 1	CIE: 50
Number of Practical Hours/Week	2 Hrs	SEE: 50
		SEE Hours: 03
Prerequisites: Concepts of C Programming		
Course Objectives:		
<ul style="list-style-type: none"> • Learn to code and execute Java programs to solve problems • Design of GUI for Java applications • Understand web applications and database connectivity. 		
LIST OF PROGRAMS		
Preliminary practice programs:		
i) Understand and acquaint with Eclipse IDE environment. Write and execute a Java program to store and access student information. ii) Write and execute a Java program to calculate sum of series of natural numbers iii) Write and execute a Java program to demonstrate the scope of variables. iv) Write and execute a Java program to find the biggest name in the array of strings. v) Write and execute a Java program to demonstrate data type casting.		
Regular Laboratory exercises (for SEE):		
(Every program should be a separate project and a package in Eclipse IDE)		
1. Write a Java Program to demonstrate the creation of class for student information. 2. Write a program in Java for String handling which performs the following: i) Checks the capacity of String Buffer objects. ii) Reverses the contents of a string given on console and converts the resultant string in upper case. iii) Reads a string from console and appends it to the resultant string of ii. 3. a. Write a JAVA Program to demonstrate Constructor Overloading and Method Overloading. b. Write a JAVA Program to implement Inner class and demonstrate its Access Protections. 4. a. Write and execute a JAVA Program to demonstrate Inheritance.(single level and multilevel) b. Write and execute a JAVA program to demonstrate method overriding.		

5. Write a JAVA program which has
 - i. A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws Less Balance Exception if an account holder tries to withdraw money which makes the balance become less than 500Rs.
 - ii. A Class called Less Balance Exception which returns the statement that says withdraw amount (___Rs) is not valid.
 - iii. A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a Less Balance Exception take appropriate action for the same.
6. Write a Java program to implement multithreading in JAVA which demonstrate built in methods available for thread.
7. Write a JAVA program using Synchronized Threads, which demonstrates Producer Consumer concept.
8. Write a JAVA program to create and import packages in JAVA
9. Write a JAVA Program to demonstrate multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
10. Write a JAVA applet program to create a basic Applet having buttons, text area GUI controls to add & subtract two nos. Use appropriate event listeners.

Write a Java program to store, delete and update data in a database with the support of JDBC-ODBC connectivity.

Question paper pattern:

Note : For SEE, students will be asked to execute two programs, selecting one program from each part.

REFERENCES:

www.tutorialpoint.com , www.w3schools.com

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO #	Course Outcome (CO)
21CGL42	CO1	Implement Java programs with basic concepts of Object oriented programming.
	CO2	Demonstrate constructors, Run-time and user-defined exceptions.
	CO3	Develop code for Inheritance, method overriding and overloading
	CO4	Design interactive GUI Java programs using applets and event handling programs
	CO5	Develop web application using JDBC-ODBC connectivity.

Course Title: WEB APPLICATION DEVELOPMENT LAB		
SubjectCode: 21CGL43	Credit : 1	CIE:50
Number of Practical Hours/Week	2Hrs	SEE:50
		SEEHours:03
Prerequisites: Knowledge of Basic Programming languages, HTML basics.		
Course Objectives: <ul style="list-style-type: none"> ● Provide the principles and programming skills for development of Web applications. ● Enables students to develop skills for client/server programming and database applications Management. 		
LIST OF PROGRAMS		
<ol style="list-style-type: none"> 1.Create an HTML documents to study various HTML tags, style sheets and the tag, Borders, padding, color, and the tag. 2.Develop a JavaScript embedded HTML file for. <ol style="list-style-type: none"> a) Generating Sum of n numbers. Use alert window to display the result b) Determine the roots of Quadratic Equation. Use document. Write to produce output. 3. Learn various array and object operations and perform the following operations: <ol style="list-style-type: none"> a) Create an empty array with name ‘todoList’ b) Use ‘push’ operation on the ‘todoList’ array to add few objects each having ‘id’ as key and string as value (for ex {id:”a”},{id:”b”}) c) Use ‘pop’ operation to remove the last element from the ‘todoList’ array. d) Use ‘filter’ operation to return a new array of objects with no object having id as “a” 4. Create a modal window using absolute positioning in CSS and use JavaScript for opening and closing the modal. 5. Learn basic flex commands and design a price card using flexbox for positioning of elements. 6. Design a website which dynamically adds and removes contents (To-Do list) using flexbox. 7. Analyze the working of CSS grid layout and create a website using grid layout. 8. Develop a weather website using REST API in JavaScript and use CSS Grid for positioning. 9. Install, configure, compare and discuss features of any open-source webserver, my SQL, PHP. 10. Write a PHP program to store current data-time in a COOKIE and display the Last visited on “date-time on the web page upon reopening the same page. 11. Run SQL queries to do the following: create a database, create table, insert rows in a table, fetch rows from a table, delete a row, and update a row. 		

12. On any HTML page, include a link for Login. Write a login page having login/password fields. Write JavaScript code to validate the login-id and password for the following: both are properly formed and at least 6 bytes long; the password contains at least one special case, one capital and one numeric character; convert the password into its MD5 hash use table created in experiment
13. Open ended experiment: Using bootstrap tool develop an e commerce website.

Question paper pattern:

For SEE similar question related to the above programs will be asked.

Course outcomes:

On completion of the course, the student will have the ability to:

Course Code	CO#	Course Outcome(CO)
21CGL43	CO1	Design of Static web programming using HTML.
	CO2	Create web pages using HTML, Cascading Style Sheets, JavaScript.
	CO3	Design and implement dynamic Web pages with server side Information using Perl.
	CO4	Write PHP programs to for client server interaction.
	CO5	Develop database applications using MySQL database with PHP.