Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology

(An Autonomous Institute affiliated to University of Pune)

Structure & Syllabus of

B.Tech. (Information Technology)

Pattern 'A-14'
Effective from Academic Year 2015-16

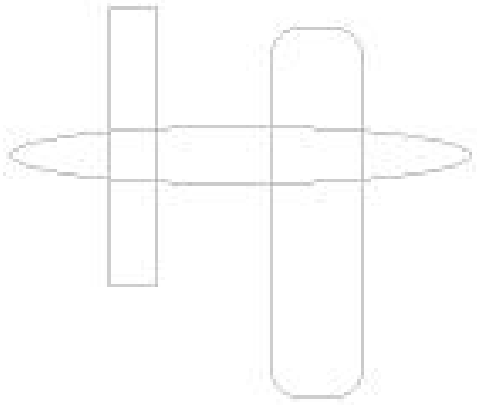
Prepared by: - Board of Studies in Information Technology

Approved by: - Academic Board, Vishwakarma Institute of Technology, Pune

Signed by

Chairman – BOS Chairman – Academic Board

Contents



Program Educational Objectives (PEO)
B.Tech (Information Technology)

List of Programme Education Outcomes [PEO]

PEO	PEO Focus	PEO Statement
PEO1	**Preparation**	To prepare the students with a commitment towards meeting the needs of users within an organizational and societal context through the selection, creation, application, integration and administration of Information Technology projects.
PEO2	**Core competence**	To facilitate students with foundation of mathematical & engineering fundamentals along with knowledge of Information Technology principles and applications and be able to integrate this knowledge in a variety of business and inter-disciplinary setting.
PEO3	**Breadth**	To enable student to exercise problem solving capacity with effective use of analysis, design, development that address idea realization.
PEO4	**Professionalism**	To inculcate students with professional and ethical values communication and collaboration skill and involvement in team work as a member having multidisciplinary knowledge useful to the society.
PEO5	**Learning Environment**	To provide students an academic environment that developed leadership qualities, excellent in subject area of computer engineering and lifelong learning in every sphere of their life.

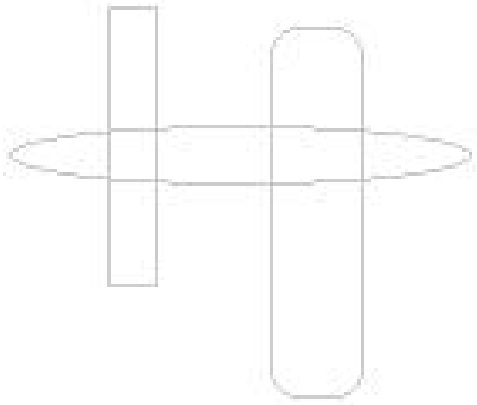
List of Programme Outcomes [PO]

Graduates will be able

PO	Graduate Attributes	PO Statement
PO1	**GA: 1 Engineering Knowledge**	1. To apply scientific and mathematical principles in order to determine conceptual aspects of real world problems in information engineering. 2. To apply algorithmic principles and information science theory for comprehending technological trade-off. 3. To explore conceptual paradigms with incorporation of programming practices.
PO2	**GA: 2 Problem Analysis**	4. To recognize and synthesize the context of the problem leading to correct and consistent requirements. 5. To analyze and formulate problem frames in order to receive decomposition structure of information engineering/technology problem. 6. To identify resources, infrastructure and technology required to realize solution of real world problem.
PO3	**GA: 3 Design/ Development of solution**	7. To plan and devise design alternatives which leads to conceive optimal solution. 8. To compose technical design specifications for formally expressing the solution implementation. 9. To practice template based approaches for formulating engineering artifacts addressing information engineering/ technology problem.
PO4	**GA: 4 Conduct Investigation of Complex Problem**	10. To apply research knowledge in order to recognize information engineering/technology problem issues. 11. To investigate real world information engineering/technology problem with cause effect analysis and inference. 12. To apply research methods to determine impact and severity of

		problem.
PO5	**GA: 5** **Modern Tool Usage**	13. To select appropriate tools for solution development. 14. To demonstrate ability to formulate and answer empirical questions. 15. To apply techniques and methods to create, enhance, and deliver IT tools.
PO6	**GA: 6** **The Engineer and Society**	16. To devise engineering solutions in a meaningful and useful way to address societal needs. 17. To impart technological solutions with legal commitments and cultural diversity.
PO7	**GA: 7** **Environment and sustainability**	18. To recognize impact of engineering solutions on society. 19. To adapt to changing technological scenarios in order to realize socio-technical solutions.
PO8	**GA: 8** **Ethics**	20. To adhere to ethical responsibility. 21. To follow norms of engineering practice.
PO9	**GA: 9** **Individual and Team Work**	22. To interact professionally at work places with effective team work. 23. To demonstrate synergistic leadership skills while addressing multi-disciplinary complex problems.
PO10	**GA: 10** **Communication**	24. To demonstrate proficiency in technical and social communications. 25. To interpret and represent engineering artifacts considering IT environment.
PO11	**GA: 11** **Lifelong Learning**	26. To undertake refresher courses and consultancy projects with participation in continuous development of organization. 27. To improve the skills in refining and updating information engineering knowledge base. 28. To strive for continuous career building in information technology by higher education.
PO12	**GA: 12** **Project Management**	29. To determine project specific constraints, forces, resources and schedule. 30. To acquire projects from competitive global world by

	and Finance	conceptualizing and framing unique ideas.



F.Y. B. Tech. Structure with effect from Academic Year 2015-16

Module 1

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10109	Linear Algebra and Random Variables	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10103	Modern Physics	Theory – Core	3	-	1	10	20	5	5	-	60	4
CH10101	Chemistry	Theory – Core	3	-	-	15	20	5	-	-	60	3
ME10101	Engineering Graphics	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16101 HS16103 HS16105 HS16107	Sociology Psychology Philosophy EVS	Theory – OE	2	-	-	15	20	5	-	-	60	2
HS10301	Engineering Graphics Lab	Lab – Core	-	2	-	-	-	-		70	30	1
CH10301	Science Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17401	Mini Project	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

F.Y. B. Tech. Structure with effect from Academic Year 2015-16

Module 2

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10102	Differential Integral and Calculus	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10104	Engineering Mechanics	Theory – Core	3	-	1	10	20	5	5	-	60	4
HS10108	Electrical Engineering Fundamentals	Theory – Core	3	-	-	15	20	5	-	-	60	3
CS10102	Computer Programming	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16102 HS16104 HS16106 HS16108	Economics Management Technology Cost & Acc. Business Law	Theory – OE	2	-	-	15	20	5	-	-	60	2
CS10302	Computer Programming	Lab – Core	-	2	-	-	-	-		70	30	1
HS10306	Engineering Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17402	Mini Project	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

F.Y. B. Tech. Structure with effect from Academic Year 2015-16

Semester I – Irrespective of Module

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10107	Communication Skill	Comm. Skill	-	2	-	-	-	-		70	30	1
HS153xx	General Proficiency	GP	-	2	-	-	-	-		70	30	1
HS15301 HS15302 HS15303 HS15304 HS15305	English I French I German I Spanish I Japanese I	Language	-	2	-	-	-	-		70	30	1
HS14301	Engineering Workshop	Workshop	-	2	-	-	-	-		70	30	1
TOTAL			**-**	**8**	**-**							**4**

F.Y. B. Tech. Structure with effect from Academic Year 2015-16

Semester II – Irrespective of Module

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS17301	General seminar I	Comm. Skill	-	2	-	-	-	-		70	30	1
HS153xx	General Proficiency	GP	-	2	-	-	-	-		70	30	1
HS15306 HS15307 HS15308 HS15309 HS15310	French II German II Spanish II Japanese II English II	Language	-	2	-	-	-	-		70	30	1
HS14302	Trade Workshop	Workshop	-	2	-	-	-	-		70	30	1
		TOTAL	**-**	**8**	**-**							**4**

HS153xx : General Proficiency Courses as per following list

List of General Proficiency Courses
FY B Tech
AY 2015-16

Sr. No.	**Course Code**	**Name of Course**
1	HS15311	Flute
2	HS15312	Guitar
3	HS15313	Tabla
4	HS15314	Bharat Natyam
5	HS15317	Yoga
6	HS15318	Pranayam
7	HS15319	Aerobics
8	HS15321	Photography
9	HS15322	Digital Photography
10	HS15323	Volleyball
11	HS15324	Chess
12	HS15325	Taekwondo
13	HS15326	Film Appreciation
14	HS15327	Shares and Stocks
15	HS15328	Fundamentals of Banking
16	HS15329	Nutrition and Fitness
17	HS15330	Spirit of Entrepreneurship
18	HS15331	Memory Techniques
19	HS15332	Sanskrit Sambhashanam
20	HS15333	Numerology

FF No. : 654 A

CS10102:: COMPUTER PROGRAMMING

Credits: 03 **Teaching Scheme: -** Theory 3 Hrs/Week

Prerequisites:

Unit 1: **(8+2 Hrs)**

Part A: Introduction to Programming: Problem solving using computers and logic design. Algorithms and their representations: flowcharts, pseudo code. Designing algorithms for problems like finding min-max, mean, median, mode, mensuration and roots of a quadratic equation. Concept of programming languages for implementing algorithms – levels of languages. Role of assemblers, compilers, linker, loader, interpreter in program execution.

Introduction to C: "Hello World" in C – editor, compiler, execution environment.C as a middle level language. Basic structure of C program, standard library and header files, Syntax and Semantics. Variable, constant (literal and named), Data types, variable declaration. Assignment. Operators: Arithmetic, logical, relational, Expressions, Precedence & Associativity. Input and output statements, escape sequences.

Part B: Bits and bytes – importance of digital representation in computers. Number System and algorithms for inter conversions.C programming on Linux and Windows.

Unit 2: **(8+2 Hrs)**

Part A: Flow of Control: Selection Statement: if, nested if –else, Conditional Expression, Switch statements. Iteration Statements: for loop, while loop, do -while loop, nested loop. Statements: go to, break & continue. Common programming errors. Application of C constructs in solving problems like generating arithmetic and geometric progression, prime numbers.

Arrays: Concept, declaration and initialization of arrays, accessing individual elements of array. Use of arrays in sorting, searching. Concept of 2-D array (Matrix), row major and column major representation of array, address calculation for accessing the individual element.

Part B: Static variables and constants in C language.

Unit 3: **(8+2 Hrs)**

Part A:

Functions: Need of functions, function declaration, definition and call. Inbuilt functions and user defined functions. Passing arguments to a function, returning values from a function.Scope of variable, local and global variable. Access specifiers.Passing arrays to functions.

Recursive Functions: Need of Recursion, direct recursion, indirect recursion, impact of recursion on local& global variables, examples of recursive programs – factorial, progressions, towers of Hanoi. Recursive vs Iterative solutions.Disadvantages of recursion.

Part B: Preprocessor and preprocessor directives: macro substitution, difference between macro and functions.

Unit 4: **(8+2 Hrs)**
Part A:

Pointers: Concept of pointers, relevance of data type in pointer variable, pointer arithmetic. Pointer to pointer. Pointers and functions (passing pointers to functions, returning pointers from functions). Pointers and arrays. Pointers and strings. Pointer constants. Array of pointers, pointer to array. Various alternatives of accessing arrays (1-D and 2-D) using pointers.

Strings: Strings as arrays, character array versus strings, reading strings, writing strings, user defined functions for string operations – copy, concatenate, length, reverse, converting case, appending, comparing two string, extracting a substring. Array of strings.

Part B: Const keyword in C, standard string library functions in string.h for string manipulation.

Unit 5: **(8+2 Hrs)**
Part A: Structures: Notion, declaration and initialization, structure variables, accessing and assigning values of the fields, "size of" operator, functions and structures, arrays of structures, nested structures, pointers and structures, passing structure to a function and returning structure from function. Dynamic memory allocation, type casting, Introduction to self referential structures, linked list as a dynamic alternative to arrays.

File Handling in C: file types,file opening modes, file handling I/O – fprintf, fscanf, fwrite, fread, fseek. File pointers. Implementing basic file operations in C.

Part B: Typedef keyword. Union, Nesting of Structure and Union. Enumerated data types.

Text Books

1. "An Introduction to Programming through C++ ", Abhiram Ranade, Mc Graw Hill Education. ISBN 978-9-33-290151-3

2. “Programming with C- Schaum’s outline Series”, B. Gottfried, Second edition, Tata McGraw Hill Publication, ISBN 0-07-463491-7,
3. “Let us C”, Y. Kanetkar, Second Edition, BPB Publication. ISBN: 8176566217.

Reference Books

1. *"Programming language – ANSI C", Brain W Kernighan and Dennis Ritchie, Second edition ISBN 0-13-110370-9,*

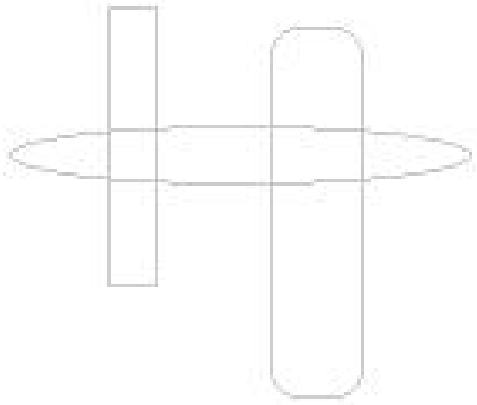
Additional Reading

1. *"A first book of C- Fundamental of C Programming", Gary Bronson and Stephen Menconi, ISBN: 0314073361,*

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. List procedural programming benefits to construct concise solutions
2. Interpret and develop naturo-visual representation of problem in hand.
3. Apply available algorithmic principles to general efficient solutions
4. Justify modular programming approach by making use of elementary as well as superior data structures.
5. Apply programming fundamentals with generic prototype.
6. Evaluate and manipulate given solutions in reengineered view



FF No. : 654 B

CS10302:: COMPUTER PROGRAMMING LAB

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites:

List of Practicals

1. Study of most important DOS/UNIX commands.

2. Write a program in C to find largest element / average of given N elements / sum / reverse of a given integer.

3. Write a program in C to implement a simple mathematical calculator

4. Write a program in C to read an integer and display each of the digits of an integer in English.

5. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

6. Write a program in C to perform Addition / Subtraction / Multiplication of two Matrices. Also determine whether the matrix is symmetric / skewed.

7. Write a program in C to carry out following operations on strings using string library Functions:
a. Length of a sting.
b. Copy a string.
c. Concatenation of strings.

8. Write a program in C to carry out following operations on strings without using string library functions
a. Compare two strings.
b. Reverse given string.
c. To check if the given string is a palindrome or not.

9. Write a program in C to carry out following operations on strings using pointers.
a. Length of a sting.
b. Concatenation of strings.
c. Copy of string
d. Compare two strings.

10. Write a C program that works with complex numbers using a structure. Perform the

following operations:
a. Reading a complex number.
b. Addition of two complex numbers.
c. Writing a complex number.
d. Multiplication of two complex numbers.

11. Write a C program to create a database of students by using array of structure and perform following operations on it.
a. Accept/modify record of student
b. Search a particular record
c. Display all records

12. Write a program in C that use both recursive and non-recursive functions to find the Factorial / GCD (greatest common divisor) of two given integers / Fibonacci series.

13. Write a program in C to sort n integers using bubble / merge sort.

14. Write a program in C to search a number in a given list using linear / binary search.

Text Books

1. "Programming with C- Schaum's outline Series", B. Gottfried, Second edition, Tata McGraw Hill Publication, ISBN 0-07-463491-7,
2. "Let us C", Y. Kanetkar, Second Edition, BPB Publication. ISBN: 8176566217.

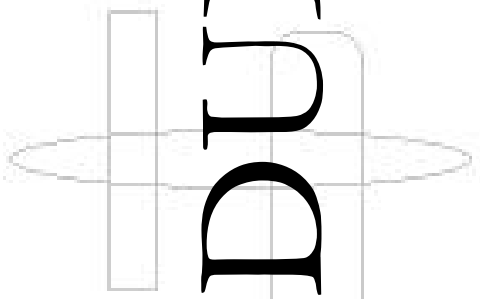
Reference Books

1. "Programming language – ANSI C", Brain W Kernighan and Dennis Ritchie, Second edition ISBN 0-13-110370-9,
2. " Object Oriented Programming with C+ +", E. Balaguruswamy, Tata McGraw Hill Publication, ISBN 0-07-462038-x.

Additional Reading

1. "A first book of C- Fundamental of C Programming", Gary Bronson and Stephen Menconi, ISBN: 0314073361,
2. "C++ Program Design: An introduction to Programming and Object-Oriented Design", Cohoon and Davidson, 3rd Edition, Tata McGraw Hill. 2003, ISBN-13: 978-0-07-122649-3.

MODULE IV



FF No. 653 Issue 4, Rev. 1 , Dt. 01/03/2014

S.Y. B. Tech. Structure with effect from Academic Year 2015-16
Module 1V

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
CS21104	Mathematical Transforms and Applications	S_1	3	-	1	10	20	5	5	-	60	4
CS20110	Computer Graphics	S_2	3	-	-	15	20	5	-	-	60	4
CS20105	Principles of Programming Languages	S_3	3	-	-	15	20	5	-	-	60	3
CS21112	Data Communicatio n	S_4	2	-	1	10	20	5	5	-	60	3
*CS20113 #CS20114	Digital Electronics and Logic Design Microprocessor and Interfacing	S_5	3	-	1	10	20	5	5	-	60	4
CS20310	Computer Graphics	P_1	-	4	-	-	-	-		30	70	1
CS20305	Principles of Programming Languages	P_2		2						30	70	1
*CS20313	Digital	MP_3		4						30	70	2

#CS20314	Electronics Microprocessor and Interfacing											
CS27402	Mini Project	SD_3		2						30	70	1
CS24302 CS24304 CS24307	ASP.net OR Python Ruby Programming	LAB_3		2						70	30	1
*LAB_4	Technical Writing	LAB_3								70	30	1
#LAB_3	General Seminar – 2	LAB_3								70	30	1
CS20401	Comprehensive Viva Voce	CVV_1										2
		TOTAL	**16**	**14**	**2**							**25**

* Students will register only in Semester III irrespective of Module

\# Students will register only in Semester IV irrespective of Module

FF No. : 654 A

CS21104:: MATHEMATICAL TRANSFORMS AND APPLICATIONS

Credits: 03 **Teaching Scheme: -** Theory 3 Hrs/Week

Prerequisites: Engineering Mathematics- I and Engineering Mathematics - II

Unit 1: **(08 Hrs)**
Linear Differential equations of higher order

Part A. Homogeneous Linear Differential Equations of Second Order, Higher Order Homogeneous & Non Homogeneous Linear Differential Equations with Constant Coefficients, Complementary solution, particular integral by general method, undetermined coefficients and Variation of Parameters method, Euler – Cauchy Equation, Legendre equation and its solution, system of differential equations by matrix method.

Part B. Electrical circuits and Coupled circuits

Unit 2: **(08 Hrs)**
Complex Analysis

Part A: Complex differentiation, Analytical functions, Cauchy-Riemann equations, Complex Integration, Cauchy's Integral Theorem and formula, Residue Theorem and applications to Engineering Problems, Power series, Taylor series, Laurent series, Radius of convergence.

Part B: Bilinear Transformations and Conformal mapping.

(08 Hrs)

Unit 3:
Laplace Transform

Part A: Introduction to Laplace Transform and its properties. Laplace Transform of Unit step function, Delta function and periodic function. Inverse Laplace Transform and its evaluation. Laplace Transform of special functions.

Part B: Application of Laplace transform to simultaneous differential equations.

Unit 4: **(08 Hrs)**
Fourier Transform

A. Introduction to signals and their properties, mathematical operations on signals, Complex Fourier series and frequency spectrum, Fourier integrals, Fourier cosine and sine transforms, Fourier transforms, properties of Fourier transform, Discrete Fourier transform, Properties.

B. Applications of FT and DFT

(08 Hrs)

Unit 5:
Z Transform

A. Introduction to Z Transform, Standard Z transforms, Region of Convergence, properties of Z-Transform, Convolution Theorem for Z transform Inverse Z-Transform by Partial Fraction, Use of standard transform, Inversion Integral Method, Poles and Zeros of the Rational Z-Transform

B. Difference equations by Z transform method.

Text Books

1. *"Advanced Engineering Mathematics", Erwin Kreyszig, John Wiley and sons, inc.*
2. *"Higher Engineering Mathematics", B V Ramana, Tata McGraw-Hill, 2007.*
3. *"Advanced Engineering Mathematics", R.K. Jain, S.R.K. Iyengar, Narosa Publications.*
4. *"Signals and Systems", Alan V. Oppenheim (Author), Alan S. Willsky ; 2nd edition, Pearson Education Ltd.*

Reference Books

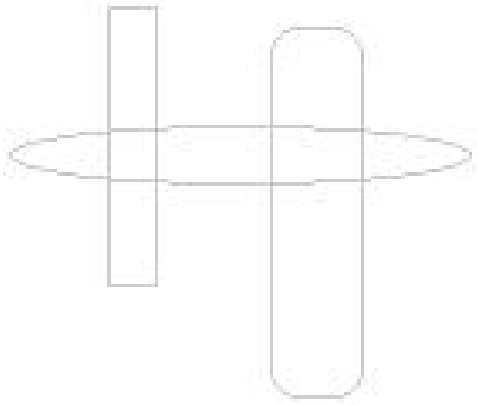
1. *Michael D. Greenberg; Advanced Engineering Mathematics; Pearson Education Asia*
2. *Dennis G. Zill, Michael R. Cullen; Advanced Engineering Mathematics; Narosa Publishing House*
3. *Peter V. O'Neil; Advanced Engineering Mathematics; 5th edition, Thomson Brooks/Cole.*
4. *Robert A. Gabel, Richard A. Roberts; Signals and linear systems; John Wiley & sons.*

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. **Relate** the indispensible importance of Mathematics in Engineering and symbiosis between both.
2. **Summarize** the concepts of mathematical transforms and their applications to various engineering problems
3. **Develop** the ability to solve linear differential equations with constant coefficients and apply it for analysis of electrical circuits.

4. **Describe** the basic concepts of complex differentiation and integration and their application in mathematical and engineering problems.
5. **Utilize** Z transform and its properties in solving difference equations and system analysis.
6. **Translate** a physical problem into a mathematical model and find solution of the model by selecting and applying suitable mathematical method



CS20110::COMPUTER GRAPHICS **FF No. : 654 A**

Credits: 03 **Teaching Scheme: -** Theory 3 Hrs/Week

Prerequisites: C programming

Unit 1 : Basic Concepts **(8 +1 Hrs)**

Part A: Graphics Primitives: Introduction to computer graphics, Display adapters, Display modes, Pixel, Frame Buffer, Display file structure, Display file interpreter, Raster scan & random scan displays, Aspect Ratio.

Mathematical foundations: Lines and line representations, Vectors, Intersection of lines, Normalized Device Coordinates.

Scan conversions: DDA and Bresenham's line drawing algorithms and Bresenham and Midpoint circle drawing algorithms, Arcs and Sectors, Aliasing and Antialiasing, Character Generation techniques.

Part B: Display devices, Interactive devices, Data generating devices, Thick lines.

Unit 2 : Polygons and 2D Transformation **(9+1 Hrs)**

Part A: Polygons: Introduction, Types of polygons, Inside-outside test of polygon, Polygon filling: Flood fill, Boundary fill, Edge fill, Scan line fill algorithm.
2D Transformations: Introduction, Basic transformations such as- Scaling, Rotation, Translation, Homogeneous coordinates for transformations, Other transformations like – Reflection, Shearing Transformations, Transformations about an arbitrary point, Inverse transformations. Numerical problems on transformation

Part B: Fence fill algorithm, Problems on 2D transformation.

Unit 3 : Segments and Clipping **(9+1 Hrs)**

Part A: Segment: Introduction, Segment table, Segment Creation, Closing, Delete and renaming, Image transformation, Display structures used for segment.
Windowing and Clipping: Introduction, viewing transformation, Line clipping: Cohen Sutherland algorithm, Mid-point line clipping algorithm, Polygon clipping: Sutherland Hodgeman algorithm, Weiler Atherton algorithm, Text clipping, Interior and Exterior clipping.

Part B: Liang-Barsky algorithm, Cyrus Beck algorithm.

Unit 4 : 3D Transformations and Projections **(7+1 Hrs)**

Part A: 3D Transformations: Introduction, 3D point representation, Left handed system, Right handed system, Basic 3D transformations- Scaling, Rotation, Translation, Matrix representation, Derivation of Rotation matrices along the main axis, Rotation about an arbitrary axis, Reflection transformation with respect to main axes.

Projection: Projection concept, parallel and perspective projections, Viewing parameters, 3D windowing and clipping.

Part B: Reflection transformation with respect to planes, Problems based on 3D transformations

Unit 5 : Hidden Surfaces, Curves and Fractals (7+1 Hrs)

Part A: Introduction, Back-face removal algorithm, Z buffers, Painters algorithm, Warnock algorithm, binary space partition method.
Curve generation, Curve continuity, Interpolation, LeGrange interpolating algorithms, Spline curve representation, B Spline Curves, Bezier Curves, Fractals, Hilbert curve, Triadic Koch Curve, Fractal lines.
Introduction to light, Light Illumination models (Diffuse, Ambient, Specular), Point source illumination, Shading Algorithms (Phong, Gourad), Color, RGB Color Model.

Part B: Scan line algorithm for Depth Comparison, Fractal surfaces, CMY and HSV color model

Text Books:

1. "Computer Graphics", D. Hearn, M. Baker, 2nd Edition, Pearson Education, 2002, ISBN 81-7808-794-4.

2. "Procedural Elements for Computer Graphics", D. Rogers, 2nd Edition, Tata McGraw-Hill Publication, 2001, ISBN 0-07-047371-4.

Reference Books:

1. "Computer Graphics", S. Harrington, 2nd Edition, McGraw-Hill Publications, ISBN 0 - 07 - 100472 -6.
2. "Computer Graphics Principles and Practice", J. Foley, V. Dam, S. Feiner, J. Hughes, 2nd Edition, Pearson Education, 2003, ISBN 81-7808-038-9.

Course Outcomes:
Upon completion of the course, the graduates will be able to …

1. Apply mathematics and computer programming to computer graphics applications and problem solutions.
2. Utilize algorithms to draw, fill and clip basic geometrical shapes.
3. Construct animation based demonstrating system using segments and transformations.
4. Systematically identify and solve technical and aesthetic problems of transformations and projections.
5. Interpret the models of illumination, colors and hidden surfaces for representation of interactive graphics systems.
6. Devise and frame new set of algorithmic principles for efficient solutions useful to computing community.

FF No. : 654 A

CS20105::PRINCIPLES OF PROGRAMMING LANGUAGES

Credits: 03 **Teaching Scheme: -** Theory 3 Hrs/Week

Prerequisites:

Unit 1:
Programming language concepts (8+2 Hrs)
Part A: Language design principles. characteristics of a good programming language. Data and control abstractions in a programming language. Programming paradigms – Imperative/Procedural, Object Oriented, Functional Programming, Logic Programming.
Concepts of Imperative Programming:
Variables: lvalue and rvalue. Memory leak, invalid pointer references. Types and type checking (strong vs weak, static vs dynamic). Binding. scope, local and global variables. Activation Records, Function Calls, Recursion, Parameter passing methods, Stack-Based Storage management. Heap based storage management.
Part B: Compilers and Interpreters. Just In Time interpreters.
Unit 2: (8+2 Hrs)
Object – Oriented Programming (Java-I)
Part A: Encapsulation: Classes and Objects, Methods and Constructors. Information hiding: access modifiers and packages. Static keyword: class variables and instance variables, class methods and instance methods. this and static. Inheritance, Types of inheritance, Constructors in Derived Classes. Overriding & Hiding Fields & Methods. Polymorphism – static and dynamic. Abstract Classes & methods, Final Classes & methods. Interfaces. Exception Handling - exceptions, checked & unchecked exceptions, user-defined exceptions. Similarities and differences between C++ and Java: destructors, access modifiers, inheritance, polymorphism, garbage collection.
Part B: Pointers in C++, Destructors in C++,

Unit 3: (8+1 Hrs)
Object – Oriented Programming (Java-II)
Part A: Multithreading – Thread life Cycle, thread Priority, Thread Methods. Inter-thread Communication. Producer-Consumer using Java. Java I/O – Introduction to Streams, Readers and Writers. File Management / Processing, primitive / Object Data Processing. Java GUI: Applet vs Application. AWT vs Swing. Layout Manager. Components. Label, Button, Choice, List, Event Handling (mouse, key).
Part B: Exception Handling in C++, multiple inheritance in C++.

Unit 4: (8+2 Hrs)
Functional Programming using SCHEME
Part A: Introduction to lambda calculus. The Scheme programming Language: Atoms, Lists, lambda expressions. Functions as first class objects. Control structures,

Recursion and continuations, operations on objects, basic input output, Exceptions and conditions, lazy evaluation and streams.
Part B: Haskell

Unit 5: (8+2 Hrs)
Introduction to SCALA
Part A: What is SCALA. Classes and Objects, Types. Control structures, composition and inheritance. Packages. Pattern matching. Collections API. Working with XML. Actors and concurrency. GUI programming.
Part B: Combining SCALA and JAVA.

Text Books:

"Programming Languages Design and Implementation", T. W. Pratt, M.V.Zelkowitz, Publications, ISBN 10: 0130276782, 4th Edition

Java: The Complete Reference, Herbert Schildt, TMG Publication, ISBN 9780070636774 , 7th Edition

R Kent Dybvig, The Scheme Programming Language, Fourth Edition, MIT Press, 1990, ISBN 978-0-262-51298-5
Martin Odersky, Lex Spoon, and Bill Venners, Programming in SCALA, Second Edition, 2010. Artima.

Cay Horstmann, Scala for the Impatient, Addison Wesley, 2012.

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. Develop solutions to problems using various programming paradigms.
2. Create programs in each paradigm based on context.
3. Differentiatereal world problems based on domains.
4. Apply programming constructs for effective program design.
5. Integrate complexity issues in designing solutions using programming constructs.
6. Show good team work while working on team assignments and mini projects involving programming languages.

FF No. : 654 A

CS21112 :: DATA COMMUNICATION

Credits: 02 **Teaching Scheme: -** Theory 2 Hrs/Week

Prerequisites:

Unit 1: **(6+1 Hrs)**
Introduction to Electronic Communication

Part A: The importance of Communication, Elements of communication system, Types of electronics communication, Electromagnetic spectrum, Bandwidth, Signal Types, Noise: internal, External, Noise calculation, Nyquist theorem Shannon-Hartley theorem.

Part B:. Survey of communication applications. Numerical based on Shannon-Hartley theorem, Bandwidth calculation.

Unit 2: **(6+1 Hrs)**

Modulation Techniques

Part A: Principles of Amplitude Modulation, Modulation index and percentage of modulation, AM power distribution, Single sideband communication, AM transmitters and Receivers. Phase modulation.
Part B: FM vs. AM, FM vs. PM, AM vs. PM, Numerical based on AM, FM.

Unit 3: **(5+2 Hrs)**
Multiplexing and Communication

Part A: Introduction, FDM, TDM, WDM, CDMA, Frequency modulation principles, sideband and modulation index. Pulse code modulation, Delta modulation, Adaptive delta modulation, Differential PCM, PAM,

Part B: Parallel transmission, serial transmission.

Unit 4: **(5+1 Hrs)**
Digital Modulations

Part A: Sampling theorem, Modems, Null modems, ASK, PSK, FSK, QPSK, Line coding schemes. Frequency hopping spread spectrum, Direct sequence spread spectrum. Encoding Schemes: NRZ, NRZI, Unipolar, Bipolar, Manchester, Differential Manchester.
Part B: Cellular Telephone System, Examples on Encoding, decoding.

Unit 5: **(6+1 Hrs)**
Transmission and Propagation

Part A: Transmission modes, Antenna Fundamentals, Radio Frequency Wave propagation, Attenuation and distortion sources with examples. Dipole antenna, sectorized antenna. Error detection and correction: CRC, Hamming code, Checksum, Block coding

Part B: Transmission media wired and wireless, Microwave antenna.

Text Books

1. *"Electronic Communication Systems", by George Kennedy, Bernard Davis, Tata McGraw Hill Publication, ISBN 0-07-463682-0, Edition 4th*
2. *"Data Communications and Networking" by Behrouz Forouzan, McGraw Hill Publication, ISBN 0-07-063414-9, Edition 4th*

Reference Books

1. *"Communication Electronics- Principles and Applications", by Frenzel, Tata McGraw Hill Publication, ISBN 0-07-048398-1, Edition 3rd*
2. *"Principles of Communication Systems", by Herbert Taub and Donald Schilling, McGraw Hill Publication, ISBN 0-07-062955-2, Edition 2nd.*

Additional Reading

1. *"Computer Networks", by Andrew S. Tenenbaum , Prentice Hall of India, ISBN 81-203-2175-8, 4th Edition.*
2. *"Data and Computer Communications", by Stallings W, Prentice Hall of India Pvt. Ltd., 2002, ISBN 81-203-2067-0, Sixth Edition.*
3. *"Digital and Analog Communication Systems", by Shanmugam K, John Wiley & Sons (Asia) Pvt. Ltd. ISBN 9971-51-146-0.*

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. Enumerate basics of signals, multiplexing, modulation and transmission.
2. Apply modulation and multiplexing techniques to optimize the channel requirements.
3. Compute the bandwidth, throughput, channel efficiency for different multiplexing and modulation techniques.
4. Recommend encoding techniques for communication system.
5. Justify the modulation, encoding and multiplexing techniques for specified communication system.
6. Evaluate the performance of network using error detection and correction methods.

FF No. : 654 A

CS20114:: MICROPROCESSOR AND INTERFACING

Credits: 03 **Teaching Scheme: -** Theory 3 Hrs/Week
Prerequisites: Digital Electronics and Logic Design.

Unit 1: **(8+1 Hrs)**
8086 Microprocessor

Part A: Introduction to 80x86 microprocessor, Internal Architecture, Generation of physical address, Minimum & Maximum Mode, Ready and Reset pin significance ,study of 8086 supporting chips 8282(Latch), 8284(Clock Generator), 8286(Transreceiver), 8288(Bus Controller). Timing Diagram Read Write Machine Cycles, Real Mode, General Purpose Instructions.
Part B: Instruction Set

Unit 2: **(8+1 Hrs)**
Assembly Language Programming & Interrupt Structure

Part A: Address Translation, Addressing Modes, Introduction to Assembly Language Programming, Examples on Programming. Interrupt Structure , Interrupt service Routine, Interrupt Vector Table, Hardware and Software Interrupts, INTR ,NMI , Interrupt Response, Execution of an ISR, Priority of Interrupts.
Part B: Examples on Assembly Language Programming

Unit 3: **(8+1 Hrs)**
Interfacing with 8086 – I

Part A: 8259 (Programmable Interrupt Controller): Features, Block Diagram, Control & status registers, Interfacing & Programming ,
8255 (Programmable peripheral interface 8255)-block diagram, control word, interfacing ADC (Successive Approximation Method) , DAC (R – 2R ladder Network.)

Part B: Interfacing of stepper motor, seven segment display, (8255)

Unit 4: **(8+1 Hrs)**

Interfacing with 8086 – II

Part A: 8253/8254 –(Programmable Interval timer/counter) block diagram, control word & interfacing, Mode0, Mode1, Mode3 of timer,

8251(USART): Features, Block Diagram, Control & status registers, Operating modes, Interfacing & Programming.

Part B: Programming of 8251, Programming of Timer Mode 1, Mode2, Mode 3, Mode4, Mode5

Unit 5: **(8+1 Hrs)**
DMA Controller and NDP Co processor

Part A: Concept of DMA, 8237 DMA Controller: Features, Block Diagram & programming detail.
8087(NDP) - Features, Block Diagram, Control & status registers, typical Instruction set & programming detail.

Part B: Programming of 8237 and 8087(NDP).

Text Books

1. *"Microprocessors and Interfacing", Douglas Hall, Tata McGraw Hill Publications, ISBN 0-07-025742-6, 2nd Edition.*
2. *"Advanced 80386, programming techniques " , James Turley , Tata McGraw Hill Publications, ISBN – 0-07-881342-5*

Reference Books

1. *"Advanced MS DOS Programming", Ray Duncan, BPB Publications ISBN 0 – 07 – 048677 – 8, 2nd Edition.*
2. *"Microprocessor and Peripheral Handbook", INTEL –VOL I*

Additional Reading

1. *"Assembly Language Programming", Peter Abel, Pearson Education Publications, ISBN 10:013030655, 5th Edition.*
2. *Intel Pentium Manual.*

Course Outcomes:
Upon completion of the course, graduates will be able to -

1. Describe the Structure and Internal Architecture of Microprocessor and Microprocessor Peripherals.
2. Develop simple Programs.
3. Assess a Component Requirement to solve a Computing Solution.
4. Design Interconnects of Microprocessor Peripherals.
5. Validate design outputs using standards test equipments.
6. Cooperate in devising Automation Solutions using multiple processors.

FF No. : 654 C

CS20114:: MICROPROCESSOR AND INTERFACING

Credits: 01 **Teaching Scheme: -** Tutorial 1 Hr/Week

Prerequisites:

List of Contents

A TERM-WORK containing the record of the following:

Assignments :

1. Understanding of different Memory Models
2. List various assembler directives,
3. Understand concepts of editor, assembler, linker, loader.
4. 8086 assembly language programming, to understand the basic concepts of various functions(01,02,08,09,0A) of INT 21h
5. List various debugging commands.
6. Interface 8086 microprocessor with 4KB RAM in minimum mode. Apply memory banking. Draw memory address map and explain address decoding logic.
7. Interface 8086 microprocessor with 16KB ROM in maximum mode. Draw memory address map and explain address decoding logic.
8. Design specified time delay (delay time calculation).
9. Near, Far procedures (string example).
10. Use of string instructions
11. Study of Mother Board

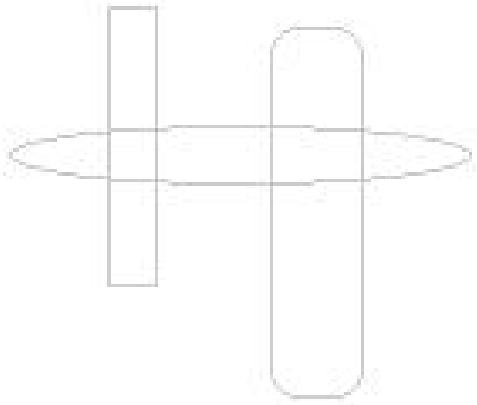
Note: Students should perform vi & vii assignments on drawing sheet

Text Books

1. *"Microprocessors and Interfacing", Douglas Hall, Tata McGraw Hill Publications, ISBN 0-07-025742-6, 2nd Edition.*
2. *"Assembly Language Programming", Peter Abel, Pearson Education Publications, ISBN 10:013030655, 5th Edition*

Reference Books

1. *"Advanced MS DOS Programming", Ray Duncan, BPB Publications ISBN 0 – 07 – 048677 – 8, 2nd Edition.*
2. *"Microprocessor and Peripheral Handbook", INTEL –VOL I*



FF No. : 654 C

CS21104:: MATHEMATICAL TRANSFORMS AND APPLICATIONS

Credits: 01 **Teaching Scheme: -** Tutorial 1 Hr/Week

Prerequisites:: Syllabus covered unit-wise in theory lectures.

List of Contents

In this module students will work on problems to practice and apply methods introduced in the theory lectures. Discussions of problems in small groups is always encouraged and facilitated. Students are asked to submit weekly home work assignments and provide them immediate feedback and support materials.

Tutorial No. 1:	Summary on higher order linear differential equations, solution of homogeneous and non homogeneous equations, complementary solution.
Tutorial No. 2:	Summary on particular solution by method of variation by parameters Method of undetermined coefficients and problems solving.
Tutorial No. 3:	Summary on Euler – Cauchy and Legendre Equation, simultaneous equations and problems solving.
Tutorial No. 4:	Summary on Functions of complex variables, Differentiation of functions of complex variables, Analytic functions, Harmonic functions, Harmonic conjugate.
Tutorial No. 5	Summary on Integration of functions of complex variables, integration along a path, Cauchy's theorem, Cauchy's integral formula, Cauchy's residue theorem and problems solving.
Tutorial No. 6:	Power Series, Taylor Series, Laurent Series
Tutorial No. 7:	Summary on Laplace transform, Laplace transform of standard functions, Properties of Laplace and problems solving.
Tutorial No. 8:	Summary on Properties of Laplace transform, Laplace transform of Unit step function, Dirac Delta function, Periodic functions and problems solving.
Tutorial No. 9:	Summary on Inverse Laplace transform, properties of inverse Laplace transform, solution of differential equations by Laplace transform method and problems solving.

Tutorial No. 10: Summary on Fourier series, Complex form of Fourier series, Fourier integral representation and problems solving,

Tutorial No. 11: Summary on Fourier transform, Sine transform, Cosine transform and corresponding inverse and problems solving.

Tutorial No. 12: Summary on Discrete Fourier Transform, properties and problems solving.

Tutorial No. 13: Summary on Summary on Z transform, properties of Z transform, inverse Z transform, methods of solution and problems solving,

Tutorial No. 14: Poles and Zeros of the Rational Z-Transform, Solution of difference equations by Z transform.

Text Books

1. *"Advanced Engineering Mathematics", Erwin Kreyszig, John Wiley and sons, inc.*
2. *"Advanced Engineering Mathematics", R.K. Jain, S.R.K. Iyengar, Narosa Publications.*
3. *"Higher Engineering Mathematics", B. S. Grewal, Khanna Publishers.*
4. *"Vector Analysis", Schaum's Outline Series, Murray R Spiegel, Seymour Lipschutz, Dennis Spellman*

FF No. : 654 B

CS20314:: MICROPROCESSOR AND INTERFACING

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites:

List of Practical

Group A: - (Any 6)

1. Study of 8086 Architecture and Execution of sample programs.
2. Write 8086 Assembly language program to access marks of 5 subjects stored in array and find overall percentage and display grade according to it.
3. Write 8086 ALP to perform block transfer operation. (Don't use string operations) Data bytes in a block stored in one array transfer to another array.Use debugger to show execution of program.
4. Write 8086 ALP to find and count negative number from the array of signed number stored in memory.
5. Write 8086 Assembly language program (ALP) to arrange the numbers stored in the array in ascending as well as descending order. Assume that the first location in the array hold the number of elements in the array and successive memory location will have actual array elements. Write a separate subroutine to arrange the numbers in ascending and descending order. Accept a key from the user.
   a. If user enters 0, Arrange in ascending
   b. If user enters 1, Arrange in descending
6. Write 8086 Alp to convert 2_digit HEX number into equivalent BCD number.
7. Write 8086 ALP to convert 2_digit BCD number into equivalent HEX number.

Group B: - (Any 6)

1. Write 8086 Assembly language program (ALP) for following operations on the string entered by the user.
   a. Concatenation of two strings
   b. Find number of words, characters

2. Write 8086 ALP to convert an analog signal in the range of 0V to 5V to its corresponding digital signal using successive approximation ADC.

3. Write 8086 ALP to interface DAC & generate following waveforms on oscilloscope. Comment on types of DAC's and write detailed specifications of the DAC used
   i) Square wave -- Variable Duty Cycle & frequency.
   ii) Stair case wave
   iii) Triangular wave

4. Write 8086 ALP to rotate a stepper motor for
   a. one clockwise rotation
   b. one anti clockwise rotation

   Write routines to accelerate and de-accelerate the motor
   Modify your program to rotate stepper motor for given angle and given direction.

5. Write 8086 ALP to program 8253 in Mode 0 . Generate a square wave with a pulse of 10 mS.

6. Write 8086 ALP to initialize 8279 & to display characters in right entry mode. Provide also the facility to display "SECOMP"/.
   a. Character in left entry mode
   b. Rolling Display
   c. Flashing Display

7. Perform an experiment to establish communication between two USART's. Initialize USART-A in asynchronous transmitter mode and interface USART-B by initializing it in asynchronous receiver mode.

Note: - Students should perform any 6 assignments from group A and any 6 assignments from group B.

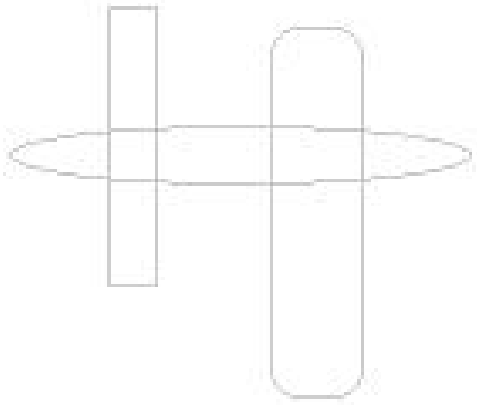
Text Books

1. *"Microprocessors and Interfacing", Douglas Hall, Tata McGraw Hill Publications, ISBN 0-07-025742-6, 2nd Edition.*
2. *"Assembly Language Programming", Peter Abel, Pearson Education Publications, ISBN*

10:013030655, 5th Edition

Reference Books

1. *"Advanced MS DOS Programming", Ray Duncan, BPB Publications ISBN 0 – 07 – 048677 – 8, 2nd Edition.*
2. *"Microprocessor and Peripheral Handbook", INTEL –VOL I*



CS20305::PRINCIPLES OF PROGRAMMING LANGUAGES

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites: C

List of Practical

1. Write a C++ program to implement the concept of objects, classes, constructors, destructors.

2. Write a C++ program to implement the concept of Inheritence and polymorphism.

3. Write a C++ program to use the concept of generic programming (generic functions and generic classes)

4. Write a JAVA program to implement the concept of class, constructor, instance variable & class variable.

5. Write a JAVA program to implement the concept of inheritance, interface & package.

6. Write a Java program to implement the concepts of static polymorphism (function overloading) and dynamic polymorphism (using function overriding)

7. Write a JAVA program to use multithreading

8. Write a JAVA program for file handling.

9. Write a Java program with Graphical User Interface.

10. Write programs to implement list operations in Scheme programming language.

11. Write program in Scala to implement basic programming constructs

12. Mini project.

Text Books

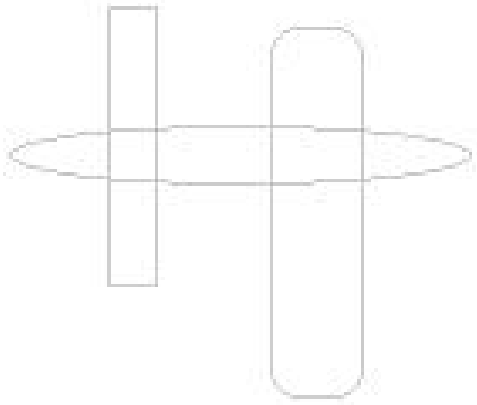
1. *"Object Oriented Programming with C++", E. Balaguruswamy, Tata McGraw-Edition*
2. *"Java: The Complete Reference", Herbert Schildt, TMG Publication, ISBN Hill Publishing Company Ltd, New Delhi ISBN 0 - 07 - 462038 – X, 49780070636774 , 7th Edition*

Reference Books

1. *"The Waite Group's Object oriented Programming in C++",R. Lafore, Galgotia Publications, ISBN 81-7515-269-9, 3rd Edition*
2. *"Core Java 2 Volume – I " ,Cay S Horstmann, Gary Cornell, Pearson Education, ISBN 9788131719459, 8th Edition*
3. *R Kent Dybvig, The Scheme Programming Language, Fourth Edition, MIT Press, 1990, ISBN 978-0-262-51298-5*
4. *Martin Odersky, Lex Spoon, and Bill Venners, Programming in SCALA, Second Edition, 2010. Artima.*

Additional Reading

1. *"Core Java Volume .II " Cornell G, Horstmann C S , Sunsoft Press, ISBN 81-7808-018-4*



CS20310::COMPUTER GRAPHICS **FF No. : 654 B**

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites: C

List of Practical

1. Write a Program to implement DDA and Bresenham Line drawing algorithm.
2. Write a Program to implement Bresenham's Circle drawing algorithm.
3. Write a Program to implement Polygon fill algorithm.
4. Write a Program to implement Scaling, rotation and translation of a 2D object.
5. Write a program to achieve animation by using segmentation.
6. Write a Program to implement Cohen Sutherland line clipping algorithm.
7. Write a Program to implement Polygon clipping algorithm.
8. Write a Program to implement Scaling, reflection about planes and axes of a 3D object.
9. Write a Program to draw a Koch curve, fractal line and surface.

Text Books

1. "Computer Graphics", S. Harrington, 2nd Edition, McGraw-Hill Publications, 1987, ISBN 0-07-100472-6.
2. "Procedural Elements for Computer Graphics", D. Rogers, 2nd Edition, Tata McGraw-Hill Publication, 2001, ISBN 0-07-047371-4.

Reference Books

1. *"Computer Graphics Principles and Practice", J. Foley, V. Dam, S. Feiner, J. Hughes, 2nd Edition, Pearson Education, 2003, ISBN 81-7808-038-9.*
2. "Computer Graphics – C Version", D. Hearn, M. Baker, 2nd Edition, Pearson Education, 2002, ISBN 81-7808-794-4.

FF No. : 654 D

CS27402:MINIPROJECT

Credits: 02

Guidelines:

The Student has to select a project in group based on a topic of interest from any of the subjects offered in current Semester. Periodically the implementation will be evaluated by the guide.

Evaluation is done in two stages. In the first review the internal Guide evaluates the project against 40% of the implementation of work. At the end of semester each group will be evaluated by externally Guide from Industry based on their Presentation, completeness of Project implementation and report artifact.

Course Outcomes

Upon completion of the course, graduates will be able to -

1. Recognize essential & dominant area of technology for achievable artifacts over rapid period of time.
2. Acquire rapid application development cycle involving prototyping to learn adequate technological environments.
3. Concisely formulate specific problem in drafted specification format.
4. Devise data dictionaries and solution design with sufficient details.
5. Demonstrate the crafted solutions to user community with a lean learning curve.
6. Validate newer dimension of extendable and scalable nature of the problem solution crafting.

FF No. : 654 B

CS24302:: ASP.NET

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites: C#.NET or VB.NET

List of Practical

1. Design simple web application using ASP.NET.
2. Design web application with different validations.
3. Design on line database application.
4. Design data report application.
5. Design web application for uploading files on web.
6. Design AJAX application.
7. Design localized web application.
8. Design WPF browser application.
9. Authentication and authorization in asp..
10. Deployment and publishing web sites.
11. Mini project.

Text Books

1. *"Beginning ASP.NET 3.5: In C# and VB", Imar Spaanjaars, Wrox publication, ISBN: 978-0-470-18759-3, March 2008.*
2. *"ASP.NET 3.5: A Beginner's Guide", William Sanders, McGraw Hill Publication, ISBN: 007159194X / 9780071591942, September 2008.*

Reference Books

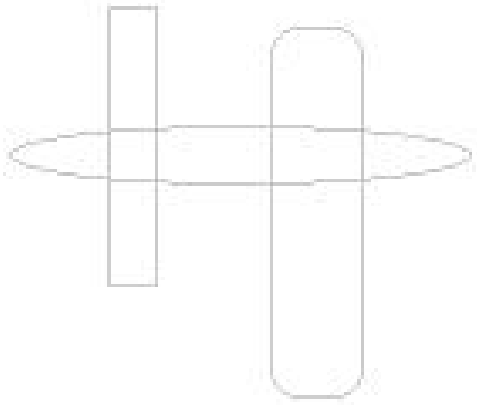
1. *"ASP.NET AJAX Programmer's Reference: with ASP.NET 2.0", Shahram Khosravi, Wrox Publication, ISBN: 978-0-470-10998-4, Sept.2007.*
2. *"Professional ASP.NET 2.0", B. Evjen, S.Hanselman, F.Muhammad, S. S. Sivakumar, D. Rader, Wrox Publication, ISBN: 978-0-7645-7610-2, Nov. 2005.*

Course Outcomes:

Upon completion of the course, graduates will be able to -

The students should be able to

1. Analyze .NET framework, Common Language Runtime (CLR), garbage collection, and assemblies, forms, collections, constructs, delegates, events and exception handling.
2. Create data-driven web applications using the .NET Framework and ADO.NET.
3. Create web applications with rich UI and bug free experience using the ASP.NET standard Validation controls.
4. Evaluate problems and alternative web solutions using ASP.Net in a wide variety of business and organisational contexts.
5. Build projects complying with architectural standards laid by Microsoft .Net Framework.
6. Obtain hands-on on .Net Technologies to acquire responsible position in government and industry sectors.



FF No. : 654 B

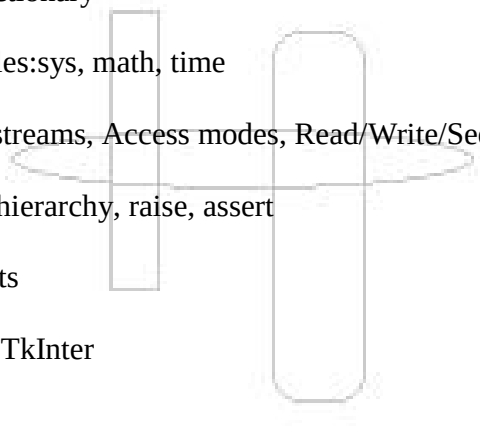
CS24304:: Python

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites: C programming.

List of Practical

1. Syntax basics, Arithmetic/String Operations, Input/Output
2. Control Flow constructs: If-else, Relational and Logical Operators
3. Iteration: While loop, For loop
4. Collections: Lits, Tuples
5. Collections: Sets, Dictionary
6. Functions and Modules:sys, math, time
7. File Handling: Data streams, Access modes, Read/Write/Seek
8. Exception handling: hierarchy, raise, assert
9. OOP: Classes, Objects
10. GUI programming: TkInter



Text Books

1. Exploring Python, Timothy Budd, Mc Graw Hill Publication, ISBN:9780073523378, August 2010.

2. Beginning Python, Peter C. Norton, Alex Samuel, Dave Aitel, Eric Foster-Johnson, Leonard Richardson, Jason Diamond, Aleatha Parker, Michael Roberts, ISBN: 978-0-7645-9654-4, August 2005.

Reference Books

1.Python: Create - Modify - Reuse, James O. Knowlton, Wrox Publication, ISBN: 978-0-470-25932-0, July 2008.

2. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. Develop functional, reliable and user friendly Python programs for given problem statement and constraints.

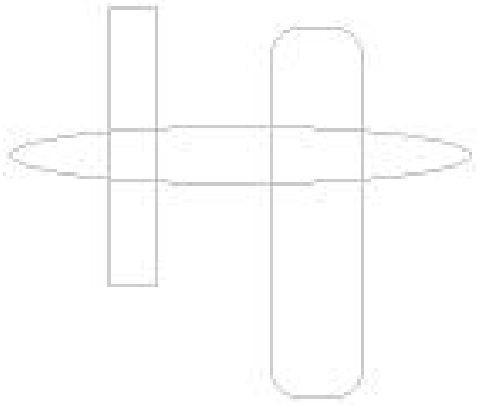
2. Correlate between the concepts of object oriented programming and the corresponding Python data structures while implementing programs using object oriented paradigm.

3. Judge a Python program in terms of correctness, space and time complexity and usability.

4. Adapt the existing solutions for familiar problems according to the needs/constraints of the similar problems.

5. Demonstrate competence through active participation in broader forums such communities supporting open source Python projects.

6. Utilize the problem solving and programming skills learned through the course for tackling relevant pressing issues in public and private sectors.



FF No. : 654 B

CS24307:: Ruby Programming

Credits: 01 **Teaching Scheme: -** Laboratory 2 Hrs/Week

Prerequisites: C programming.

List of Practical

Note: Specific exercises will be given in class.

1. Introduction to Ruby. Ruby resources. Implement a simple Ruby program to print Hello World. Understand standard types.
2. Demonstrate the use of control structures.
3. Implement a Ruby program to demonstrate arrays and hashing.
4. Implement a Ruby program for Classes and Objects. Demonstrate class constructors and methods, inheritance, access control.
5. Implement a Ruby program to demonstrate containers, blocks and iterators.
6. Implement a Ruby program to demonstrate regular expressions.
7. Implement a Ruby program to demonstrate exceptions and Input Output
8. Implement threads in Ruby.
9. Implement a website using Scaffold.
10. Implement a dynamic website using RAILS. Use MySQL as the backend.
11. Implement a game in Ruby. Also implement a simple strategy for the computer to play the game.

12. Mini Project: As assigned. This will involve implementing some application in MVC using RAILS.

Text Books

1. *Dave Thomas, Chad Fowler and Andy Hunt Programming Ruby 1.9 & 2.0 (4th edition):*

The Pragmatic Programmers' Guide
2. *http://guides.rubyonrails.org/v3.2.9/index.html*
3. *Ruby on Rails Tutorial, Michael Hartl, 3rd Edition. Addison Wesley.*

Course Outcomes:

Upon completion of the course, graduates will be able to -

1. Integrate functional specifications into an outline of a solution in RUBY.
2. Develop pragmatic programming practices in RUBY.
3. Identify good verification and validation techniques for testing code.
4. Propose RUBY patterns for new and unfamiliar problems.
5. Build a useful body of programs in RUBY for the wider developer community.
6. Utilize the programming skills for problem solving in public and private sectors.