B.Sc. COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM (CBCS)

Curriculum and Syllabus Regular (2015 – 2016)



(Established Under Section 3 of UGC Act, 1956)

DEPARTMENT OF COMPUTER SCIENCE

FACULTY OF ARTS, SCIENCE AND HUMANITIES

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University) (Established Under Section 3 of UGC Act, 1956) Eachanari (Post), Coimbatore – 641 021. Tamilnadu, India

Phone No. 0422-2980011 - 15 Fax No: 0422-2980022-23 E mail ID: info@karpagam.com Web: www.kahedu.edu.in PROGRAM OUTCOMES (POs): The program must enable students to attain by the

time of graduation

- a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement and evaluate a computer-based system, process, component or program to meet desired needs.
- d) An ability to function effectively on teams to accomplish a common goal
- e) An understanding of professional, ethical, legal, security and social issues and responsibilities
- f) An ability to communicate effectively with a range of audiences
- g) An ability to use current techniques, skills and tools necessary for computing practice
- h) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking and web systems and technologies
- i) An ability to effectively integrate IT-based solutions into the user environment
- j) An understanding of best practices and standards and their application

PROGRAM SPECIFIC OUTCOME (PSOs)

- k) Understand analyze and develop computer programs in the areas related to Database systems and Big data Analytics, cloud computing, soft computing, IoT, Image processing, Green computing, web designing, mobile computing and networking for efficient design of computer based system of varying complexity.
- Apply standard software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality for business success.
- m) Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.
- n) An ability to produce cost effective, quality and maintainable software products and solutions (services) meeting the global standards and requirements with the knowledge acquired and using the emerging techniques, tools and software engineering methodologies and principles and able to comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOI:	To be a working Information Technology (IT) professional with core
	competencies that can be used on multi-disciplinary projects
PEO II :	To understand the importance of relationship building within the IT
	industry
PEO III :	To understand the need for lifelong learning in the exploration and journey
	in IT
PEO IV :	To understand, evaluate and practice ethical behavior within the IT
	industry

PEO V : To be cognizant of security issues and their impacts on industry

MAPPING of PEOs and POs

POs	a	b	С	d	e	f	f	h	i	j	k	1	m	n
PEO I	Х	Х	Х				Х	Х	Х				Х	
PEO II				Х	Х	Х								Х
PEO III	Х	Х						Х		Х	Х			
PEO IV			Х	Х	Х				Х			Х		
PEO V					Х					Х		Х		

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University)

Established Under Section 3 of UGC Act, 1956)

Coimbatore - 641 021, India

FACULTY OF ARTS, SCIENCE AND HUMANITIES (FASH)

B.Sc Computer Science - Curriculum (CBCS) (2015 – 2018 Batch)

		Obj	ectives						
Code	Course(s)	an	d out mes	Ins*		Marks		Exa m Hrs	Credit
Cour	Course(s)	PEO s	POs	1115	CIA	ESE	Total		(s)
		SEME	ESTER –	I		1			
15LAU101	Language-I	IV	d,e	5	40	60	100	3	5
15ENU101	English-I	Ι	a,b,c	4	40	60	100	3	4
15CSU101	Computer Fundamentals & Programming in C	Ι	b,c,g	5	40	60	100	3	5
15CSU111	C Programming Lab	III	b,c,g	5	40	60	100	3	3
15CSU102	Digital Electronics	Ι	a,b,c,g	4	40	60	100	3	4
15CSU112	Digital Electronics Lab	Ι	a,c,g	3	40	60	100	3	2
15FCA101	Foundation Course– A(Value Education)	III	b,h,j	2	100	-	100	3	1
15SSD101	Soft Skill Development –I	IV	d,e	2	-	-	-	-	-
S			r Total:	30	340	360	700	-	24
	5	SEME	STER –	II					
15LAU201	Language-II	IV	d,e	5	40	60	100	3	5
15ENU201	English-II	II	d,f	4	40	60	100	3	4
15CSU201	Object Oriented Programming with C++	Ι	c,h,i	5	40	60	100	3	5
15CSU211	Object Oriented Programming with C++ Lab	III	c,h,i	5	40	60	100	3	3
15CSU202A		IV	e,a,c						
15CSU202B	Allied Elective – I			4	40	60	100	3	4
15CSU202C									
15CSU212A			ai						
15CSU212B	Allied Lab – I	Ι	e,i achi	3	40	60	100	3	2
15CSU212C			a,c,11,1						
15FCB201	Foundation Course–B (Environmental Studies)	III	h,j	2	100	-	100	3	1
15SSD101	Soft Skill Development –I	IV	d,e	2	100	-	100	-	1
		Semeste	r Total:	30	440	360	800	-	25
	1	SEME	STER – I	II		1		1	
15ENU301	English-III	II	d,f	4	40	60	100	3	4
15CSU301	Data Structures and	I	a,b,g,h	5	40	60	100	3	5

Bachelor of Science Computer Science, 2015, Karpagam Academy of Higher Education, Coimbatore #4

	Algorithms										
150811202	Lava Dragramming	т	ahi	5	40	60	100	2	5		
15050302	Java Programming	I	C,II,I	5	40	60	100	3	5		
15CSU311	Java Programming Lab	1	c,n,1	4	40	60	100	3	2		
15CSU303	Numerical Methods	- 111	a,b	6	40	60	100	3	4		
15CSU304A	_	I	a,b,h								
15CSU304B	Core Elective – I			4	40	60	100	3	4		
15CSU304C											
15SSD301	Soft Skill Development – II	IV	d,e	2	-	-	-	-	-		
Semester Total: 30 240 360 600 - 24											
	S	SEME	STER –	IV							
15ENU401	English-IV	II	d,f	4	40	60	100	3	4		
150011401	Relational Database	Ι	a,b,g,h	-	40	60	100	2	-		
15CSU401	Management System		, ,0,	6	40	60	100	3	6		
15CSU402	Operating System	III	a,b,h,k	6	40	60	100	3	6		
15CSU411	RDBMS (Oracle) Lab	Ι	a,b,g,h	6	40	60	100	3	3		
15CSU403A		III	a.b.j.k								
15CSU403B	Allied Elective – II		, ,,,,	6	40	60	100	3	4		
15CSU403C				Ũ		00	100	U	•		
15SSD301	Soft Skill Development –	IV	d,e	2	100	_	100	-	1		
	11	Somoste	n Totoli	20	200	200	600		24		
Semester 10tal: 50 500 500 - 24											
		SEME	STER -	V	1	1		1			
15CSU501	Visual Programming	IV	c,d,e,i, g	5	40	60	100	3	5		
15CSU502	Data Communication Networks	III	a,b,j,k	5	40	60	100	3	5		
15CSU503	Computer Graphics	Ι	a,b,c,	5	40	60	100	3	5		
15CSU504	Multimedia Systems	IV	ei	5	40	60	100	3	5		
15CSU5054			a bik	5	-10	00	100	5			
15CSU505R	Core Elective – II	m	u,0,j,K	5	40	60	100	3	5		
15CSU505D				5	40	00	100	5	5		
15CSU505C	Visual Programming Lab	IV	c,d,e,i,	5	40	60	100	3	3		
150EU501	Open Elective	ш	g obik			100	100	2	2		
150E0501		- III Somosto	a, U, J, K	- 20	- 240	100	700	5	21		
				<u> </u>	240	400	700	-	51		
150011601			<u> 51EK –</u>	VI ~	40	60	100	2	~		
15050601	Software Engineering		c,a,e,I	5	40	60	100	3	5		
15CSU602	Web Technology	IV	c,d,e,i, g	5	40	60	100	3	5		
15CSU603A		TIT	ahil	1	I			1			

15CSU603C									
15CSU611	Web Designing Lab	Ι	a,c,h,i, g	5	40	60	100	3	3
15CSU691	Project	II	d,e,f,n	10	80	120	200	3	5
NCC/ NSS/ Sports/ Club Activity					-	-	-	-	I
	:	Semeste	r Total:	30	240	360	600	-	23
	180	1800	2200	4000	-	151			
Additional C	ourses								
15CSU506	Advanced Java Programming	5		-	-	100	100	3	4
15CSU604	Advanced Networking				-	100	100	3	4
Honors									
15CSU507	Mobile Communication			-	-	100	100	3	5
15CSU605	Soft Computing			-	-	100	100	3	5

Allied Elective – I

Embedded Systems
PC Hardware & Trouble
Shooting
Microprocessor and its
Applications
- II
Statistical Methods
Operations Research
Discrete Mathematics
I
Compiler Design
System Software
Artificial Intelligence
II
Data Mining and
Warehousing
Big Data
Cloud Computing
III
Open Source Software
Cyber Security
Client Server Technology
E-Learning

Entrepreneur Oriented Courses -Green Employability Oriented Courses -Blue Skill Development Oriented Courses -Red

Allied Lab – I

15CSU212A	Embedded Systems Lab
15CSU212B	PC Hardware & Trouble
	Shooting Lab
15CSU212C	Microprocessor Lab

கற்பகம்உயர்கல்விகலைக்கழகம்

பகுதி - I தமிழ்ப்பாடத்திட்டம் (2015 - 2016)

முதல்பருவம்

(இளநிலை அறிவியல் பட்டவகுப்புகளுக்குரியது)

(For I-UG Science Degree Classes) 15LSU101

பாடத்திட்டப் பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- ஆய்வுநோக்கைமேம்படுத்துதல்.
- இலக்கியங்கள் உணர்த்தும் வாழ்வின் நுட்பமான பகுதிகளை உணர்த்துதல்.
- மனித மனத்தினைப் பக்குவப்படுத்துதலில் இலக்கியம் தரும் பங்கினை உணர்த்துதல்.
- வளர்ந்து வரும் சமூகத்தில் அறஉணர்வு, பண்பாடு போன்றவை குறித்து அறிவூட்டல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்.

பாடத்திட்டப் பயன்விளைவு

- இந்திய குடியுரிமைப் பணி முதலான போட்டித் தேர்வுகளில், விருப்பப்பாடமாக இடம்பெறுகின்ற, 'தமிழ் இலக்கிய வரலாறு' குறித்த முழுமையான அறிமுகம் பெற்றிருத்தல்.
- கல்வெட்டியல், ஓலைச்சுவடியியல் மற்றும் தொல்லியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வுமனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- தமிழின் வளர்ச்சித்துறையாகிய, 'அறிவியல் தமிழ்'; 'இணையதமிழ்' குறித்த பன்நோக்கு அணுகுமுறையிலான ஆய்வுச் சிந்தனை மேம்பாடு.
- வேலைவாய்ப்புக்குரிய சுயதிறன் மேம்பாட்டுடன், படைப்பாக்கத்திறன் மேம்பாடும் பெற்றிருத்தல்.
- சமுதாய மற்றும் வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக்கருவியாக இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.
- மொழிபெயப்புத்துறை சார்ந்த வேலைவாய்புத் திறன் பெற்றிருத்தல்

தாள்கள்வரிசையும்தேர்வுச்செயல்திட்டமும்பகுதி-I தமிழ்

பருவம்	தாள்	கற்பிக்கும்	தேர்வு	மதிப்பெண்	மொத்தம்	மதிப்பீடு
		நேரம்/வாரம்	மணிகள்	அக/எழுத்து		
ஒன்று	Ι	4	3	40 / 60	100	4

பகுதி – I, தமிழ்		
15LAU101 :	தமிழ் முதல் தாள்	

பருவம் I 5-H,5-C

அலகு – I : இக்கால இலக்கியம்

தத்துவம் : மகாகவி பாரதியார் – பகைவனுக்கு அருள்வாய். கவிஞர் ந.பிச்சமூர்த்தி – கிளிக்கூண்டு இயற்கை : பாவேந்தர் பாரதிதாசன் – அழகின் சிரிப்பு – ஞாயிறு. சமுதாயம் : கவிக்கோ அப்துல் ரகுமான் – இள்றைய நிலை அறிவியல் : கவிஞர் சிற்பி பாலசுப்பிரமணியன் – காலம். பெண்ணியம் : கவிஞர் சிவரமணி – வையகத்தை வெற்றிகொள்ள சூழலியல் : அன்பாதவள் - மரணம் காதல் : வைரமுத்து - காதல் உயில் தன்னம்பிக்கை பா.விஜய் - தன்னம்பிக்கை

அலகு – II : அற இலக்கியம்

- 1. திருக்குறன் தேர்ந்தெடுக்கப்பட்ட குறன்கன் 20
- நாள்மணிக்கடிகை தேர்ந்தெடுக்கப்பட்ட ஐந்து பாடல்கள்
- திரிகடுகம் தேர்ந்தெடுக்கப்பட்ட ஐந்து பாடல்கள்

அலகு - III : சிற்றிலக்கியம்

- 1. நரிவிருத்தம் அறன் வலியுறுத்தல்
- 2. தமிழ் விடு தூது தமிழிள் சிறப்புரைத்தல்
- மதுரை மீனாட்சியம்மைப் பிள்ளைத்தமிழ் தொடுக்கும் கடவுள் பழம்பாடல்

அலகு – IV : சிறுகதை

- 1. புதுமைப்பித்தன் நிகும்பலை
- தனுஷ்கோடி ராமசாமி கந்தகக் கிடங்கிலே
- 3. கந்தர்வள் துண்டு
- 4. வாஸந்தி வடிகால்
- 5. சி.ஆர். ரவீந்திரன் வழுக்குமரம்

அலகு- V : மொழிப்பயிற்சி

- விண்ணப்பங்கள் எழுதுதல் மற்றும் கடிதப் பயிற்சி
- 60 மாழிபெயர்ப்புப் பயிற்சி

பாட நூல்: கற்பகச்சோலை – தமிழ் ஏடு. கற்பகம் பல்கலைக்கழகத் தமிழ்த் துறை வெளியீடு.

Semester-I

(For all undergraduates students admitted from 2015 onwards)

Course Objectives:

- To enable the learners to acquire English language skills at a faster pace.
- To introduce different kinds of literary works
- To familiarize different genres of Literature
- To instruct moral values through literature.
- To improvise their productive and receptive skills
- To strengthen the basic knowledge about grammar.

Course Outcomes:

- 1. Learn to reflect on the literary works and communicate flexibly.
- 2. Reading and comprehending literary works
- 3. Genres of literature to provide moral education
- 4. Develop communication skills in business environment
- 5. Interpersonal skills will be developed.
- 6. Betterment of language competence

UNIT I:

Prose: Google Guys (Extract) – Richard L Brandt
Poetry: The Blind Pedlar – Osbert Sitwell
Short Story: A Garden So Rich – Christie Craig
Vocabulary: Prefixes, Antonyms, Sentence Completion
Grammar: Articles, Adverbs, Pronouns
Composition: Proverb Expansion

UNIT II:

Prose: Happiness 101 – Geeta Padmanabhan **Poetry:** An Old Woman – Arun Kolatkar **Vocabulary:** Suffixes, Analogies **Grammar:** Nouns, Adjectives **Composition:** Dialogue Writing

UNIT III:

Prose: Structured Procrastination – John Perry
Short Story: The Umbrella Man – Roald Dahl
One-Act Play: The Boy Who Stopped Smiling – Ramu Ramanathan
Vocabulary: Synonyms, Euphemisms, Word Definitions
Grammar: Verbs, Conjunctions and Interjection, Indirect/Reported Speech

UNIT IV:

Poetry: No Sentence – Anjum Hassan

One-Act Play: While the Auto Waits- O' Henry **Vocabulary:** Words Often Confused, Anagrams **Grammar:** Prepositions, Voice- Active and Passive **Composition:** Letter Writing- Informal

UNIT V:

Short Story: The Bird – Amar Jalil One-Act Play: The Cellphone Epidemic – Claudia I. Haas Vocabulary: Portmanteau Words, One Word Substitute Grammar: Questions, Pronunciation Composition: Letter Writing- Formal

Prescribed Texts:

Rao, G. Chandralekha and et al. *Spring* 2013. Emerald Publishers: Chennai. Reference

Syamala, V. English for Communication. 2006. Emerald Publishers: Chennai

- To know the basic concepts of computers and its parts
- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions
- To learn effective usage of pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.

Course Outcomes (COs)

After the completion of this course, a successful student will be able to do the following:

- 1. Understand the concept of a program in a high-level language being translated by a compiler into machine language program and then executed.
- 2. Develop programs using the basic elements like control statements, Arrays and Strings.
- 3. understand about the dynamic memory allocation using pointers which is essential for utilizing memory
- 4. Understand about the code reusability with the help of user defined functions.
- 5. Learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.
- 6. Understand the uses of preprocessors and various header file directives.

UNIT-I

Introduction to computers- characteristics- evolution of computers- computer generations- classification of computers-basic computer organization-software – types of software – overview of compilers & interpreters- Structure of C – C Tokens – Keywords and Identifier - Constants – Variables - Declarations of Variables – Data types – Type Conversion – Operators and Expressions - Formatted and Unformatted I/O Operations. Design a code to find range of fundamental data types.

UNIT-II

Decision Statements – Loop Control Statements – Arrays: Initialization of array – Characteristic of Array- Array types. Strings - String Handling Functions. Design a Calculator using Loop.

UNIT-III

Functions - Introduction - Definition of Functions - Function Declaration - Types of Functions - Recursion. Structures and Unions : Introduction - Defining a Structure -

Declaring Structure Variables - Arrays of Structure-Structures & Function- Typedef-Enumerated data type – Unions – Bit fields.

Design a code to reverse all the bits of an 32 bit integer.

UNIT-IV

Pointers – Introduction – Declaring Pointer Variables - Pointer and Arrays - Pointers and Strings – Array of Pointers - Functions and Pointers - Function Returning Pointers - Pointers to functions - Pointers and Structures. Storage Classes – Auto-extern-static-register.

UNIT-V

File Management in C – Introduction - Defining a File – Steps for file operations – Input/output operations on files - Error handling During I/O Operations - Random Access to Files - Command Line Arguments - The Preprocessor. Design a code to shut down the computer.

TEXT BOOK

1. Ashok N. Kamthane, ITL Education Solutions Limited, 2013. C Programming. 1st Edition, Pearson education, New Delhi.

(Page Nos.: 1-18, 29-37,259-261,269-282,291-310,317-334,341-365,373-404,415-452,467-473,481-500,519-540,551-559,581-597, 617-631,673-719)

REFERENCES

- 1. Dixit .J.B. 2007. Programming in C. 1st Edition, Firewall Media Publications, New Delhi.
- 2. Karthikeyan E. 2008. Text book on C: Fundamentals, Data Structures and Programming, 1st Edition, PHI, New Delhi.
- 3. Susant K. Rout. 2008. Cimple- C is Simple.... 1st Edition, Tata McGraw Hill Publishers, New Delhi.
- 4. Yeswanth Kanetkar. 2007. Let Us C. 8th Edition, BPB Publications, New Delhi.
- 5. Balagurusamy .E. 2007. Programming in ANSI C. 4th Edition, Tata McGraw Hill Publishers, New Delhi.

WEB SITES

- 1. http://www.cs.cf.ac.uk/Dave/C/CE.html
- 2. http://www2.its.strath.ac.uk/courses/c/
- 3. http://www.iu.hio.no/~mark/CTutorial/CTutorial.html

		Semester-I
		LTPC
15CSU111	C PROGRAMMING LAB	0 0 5 3

- To know the basic concepts of computers and its parts
- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions
- To learn effective usage of pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems.

Course Outcomes (COs)

After the completion of this course, a successful student will be able to do the following:

- 1. Understand the concept of a program in a high-level language being translated by a compiler into machine language program and then executed.
- 2. Develop programs using the basic elements like control statements, Arrays and Strings.
- 3. understand about the dynamic memory allocation using pointers which is essential for utilizing memory
- 4. Understand about the code reusability with the help of user defined functions.
- 5. Learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.
- 6. Understand the uses of preprocessors and various header file directives.

List of Programs

- 1. Swapping of two numbers without using third variable
- 2. Shift input data by two bits to the left.
- 3. Find that entered year is leap year or not.
- 4. To check the given string is palindrome or not.
- 5. To Print a Fibonacci series for any number
- 6. Print a table of any number.
- 7. Program to sort the given set of numbers in ascending order.
- 8. Convert a given number into words
- 9. Write a program to add two matrices.
- 10. Find factorial of a number using recursive functions.
- 11. Program to reverse a given number without using array.
- 12. Find a substring in the main string without using library function.
- 13. Find the maximum number in array using pointer.
- 14. Mark sheet preparation using array of structures.
- 15. Copy the content of one file to another file using command line arguments.

Semester-ILTP15CSU102DIGITAL ELECTRONICS400

Course Objectives

- To enable the students to gain knowledge on the architecture of modern computer.
- To understand how computer stores positive and negative numbers and to perform arithmetic operation of positive and negative numbers.
- To learn about logic gates and solve problems using Boolean algebra.
- To understand the simplification of circuits like adders, subtractors, multiplexers, encoders.
- To understand the basic computer organization and design.
- To learn Cache memory and its importance

Course Outcomes (COs)

- 1. To provide a strong foundation in construction of Sequential and Combinational Circuits.
- 2. To familiarize with the function of Gates, Flip Flops, Shift Registers, Counters, A/D& D/A Converters and its Applications.
- 3. Solve the problems using Boolean algebra
- 4. Understand the basic computer organization and design.
- 5. learn about Cache memory and its importance
- 6. Solve the binary arithmetic problems and conversion among the number systems

UNIT I – Number System and Codes

Introduction to Digital concepts – Number Systems: Decimal, Binary, Octal and Hexadecimal Numbers – Conversion – 1's and 2's Complements of Binary Numbers – Binary Arithmetic with Signal and Unsigned Numbers – Codes: Binary Coded Decimal (BCD) — Excess-3 – Gray Code — ASCII Codes —Error Detection and Correction Codes.

UNIT II – Logic Gates and Boolean Algebra

Introduction to Logic Gates – OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR Gates. Boolean Logic and Expression, Laws and Rules of Boolean Algebra, DeMorgan's Theorem – Simplification using Boolean Algebra – Karnaugh Map.

UNIT III – Combinational Logic Circuits

Basic overview of Logic functions – Basic Adders & Subtractor – Parallel Binary Adder – 4-bit Binary Adder/Subtractor – Comparators –Encoders and Decoders – Code Converters – Multiplexers and Demultiplexers — Parity Generators/Checkers.

UNIT IV – Sequential Logic Circuits

Flip-flops: RS – Clocked RS – Edge-triggered RS, D, and JK – JK Master-Slave flip flops –Registers and it's Types –SISO, SIPO, PISO, PIPO - Shift Registers and its Types – Ring Counters – Asynchronous and Synchronous Counter – UP/DOWN Counter- Ring Counter.

UNIT V – D/A, A/D Converters

Digital to Analog converters: Resistor Networks - Binary Ladder – Analog to Digital converters: Counter type – Ramp type – Successive Approximation Type.

TEXT BOOK

- 1.Digital Electronics and its Principles, Salilvahanan, Tata McGraw Hill, Seventh Edition, 2014.
- 2.Digital Principles and Application, Albert Paul Malvino, Donald P. Leach and Goutam Saha, Tata McGraw Hill, Seventh Edition, 2010.
- 3.Digital Design: With an Introduction to Verilog HDL, Morris Mano, Pearson Education, Fifth Edition, 2013.

REFERENCES

1. Modern Digital Electronics, Jain R.P, Tata McGraw Hill Company, Fourth Edition, 2012.

2. Integrated Circuits, Botkar K.R, Khanna Publications, Fourth Edition, 2008.

		Semester-I
		LTPC
15CSU112	DIGITAL ELECTRONICS LAB	0 0 3 2
Course Objectives		

• To enable the students to gain knowledge on the architecture of modern computer.

- To understand how computer stores positive and negative numbers and to perform arithmetic operation of positive and negative numbers.
- To learn about logic gates and solve problems using Boolean algebra.
- To understand the simplification of circuits like adders, subtractors, multiplexers, encoders.
- To understand the basic computer organization and design.
- To learn Cache memory and its importance

Course Outcomes (COs)

- 1. To provide a strong foundation in construction of Sequential and Combinational Circuits.
- 2. To familiarize with the function of Gates, Flip Flops, Shift Registers, Counters, A/D& D/A Converters and its Applications.
- 3. Solve the problems using Boolean algebra
- 4. Understand the basic computer organization and design.
- 5. learn about Cache memory and its importance
- 6. Solve the binary arithmetic problems and conversion among the number systems

List of Experiments

(Any 8 Experiments)

- 1. Verification of basic gates
- 2. Realization of Logic Gates Using Universal Gates
- 3. Adder using Gates
- 4. Subtractor using Gates.
- 5. Multiplexer
- 6. Demultiplexer
- 7. Encoder
- 8. Decoder
- 9. Study of Flip-flops
- 10. Binary to Gray and Gray to Binary Converter

Semester – I 15FCA101 FOUNDATION COURSE A - VALUE EDUCATION 2H – 1C

Instruction Hours/week: L: 2 T: 0 P: 0 Marks: Internal: 100 External:Nil Total: 100

Course Objectives

- To teach and inculcate the importance of value based living and sustainable lifestyle.
- To give students a deeper understanding about the purpose of life.
- To teach and inculcate the essential qualities to become a good leader.
- To be responsible citizens with clear conviction to practice values and ethics in life.
- To create awareness about the values and their significance and role
- To imbibe the concept of discipline and freedom

Course Outcomes (COs)

- 1. Students will understand the importance of value based living.
- 2. Students will gain deeper understanding about the purpose of their life.
- 3. Students will understand and start applying the essential steps to become good leaders.
- 4. Students will emerge as responsible citizens with clear conviction to practice values and ethics in life.
- 5. Students will become value based professionals
- 6. Students will contribute in building a healthy nation

UNIT – I

Concept of Self, self-esteem and self-confidence. Concept of personality, determinants and disorgiansation of it. Personality development – meaning.

UNIT – II

Goal setting – meaning and importance; steps in goal setting Manners and Etiquette – meaning need and importance; means to improve. Positive thinking.

UNIT – III

Discipline – meaning. Concept of Roles and Responsibility Time Management – Meaning and steps for effective time management.

$\mathbf{UNIT} - \mathbf{IV}$

Interpersonal relationship – meaning and importance; means to improve it. Healthy friendship.

$\mathbf{UNIT} - \mathbf{V}$

Family Relationship importance of it; Means to improve. Spirituality – meaning. Its relationship with Altruism, sacrifice, self control, tolerance and truthfulness.

TEXT BOOKS

1. Karpagam Academy of Higher Education, Study Material, 2015.

- Students will be able to apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.
- To achieve the analytical and reasoning competencies and to improve their communication and presentation skills
- To impact knowledge on both Aptitude and Soft skills to the students
- To actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- To critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
- To reinforce competencies in soft skills which are crucial in a social setting

Course Outcomes(COs)

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

- 1. Understand the basic concepts of QUANTITATIVE ABILITY
- 2. Understand the basic concepts of LOGICAL REASONING Skills
- 3. Acquire satisfactory competency in use of VERBAL REASONING
- 4. Actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- 5. Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- 6. Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

UNIT - I

Introduction to Quantitative Aptitude, Speed Maths, Problems on Numbers, Averages, Ratios and Proportions, Problems on Ages

UNIT - II

Number Series, Blood Relation, Image Analysis, Direction Sense, Syllogism, Coding and Decoding

UNIT – III

Percentages, Data Interpretation, Profit and Loss, Simple Interest and Compound Interest

UNIT – IV

Parts of Speech, Tense, Subject Verb Agreement, Active and Passive Voice, Articles, Prepositions

UNIT - V

Conditional Clause, Degrees of Comparison, Goal Setting, Interpersonal Skills

கற்பகம்உயர்கல்விகலைக்கழகம் தமிழ்த்துறை பகுதி - I தமிழ்ப்பாடத்திட்டம் (2015 - 2016)

இரண்டாம்பருவம்

(இளநிலை அறிவியல் பட்டவகுப்புகளுக்குரியது)

(For I-UG Science Degree Classes) 15LSU201

பாடத்திட்டப்பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- ஆய்வுநோக்கைமேம்படுத்துதல்.
- இலக்கியங்கள் உணர்த்தும் வாழ்வின் நுட்பமான பகுதிகளை உணர்த்துதல்.
- மனித மனத்தினைப் பக்குவப்படுத்துதலில் இலக்கியம் தரும் பங்கினை உணர்த்துதல்.
- வளர்ந்து வரும் சமூகத்தில் அறஉணர்வு, பண்பாடு போன்றவை குறித்து அறிவூட்டல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்.

பாடத்திட்டப்பயன்விளைவு

- இந்திய குடியுரிமைப் பணி முதலான போட்டித் தேர்வுகளில், விருப்பப்பாடமாக இடம்பெறுகின்ற, 'தமிழ் இலக்கிய வரலாறு' குறித்த முழுமையான அறிமுகம் பெற்றிருத்தல்.
- கல்வெட்டியல், ஓலைச்சுவடியியல் மற்றும் தொல்லியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வுமனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- தமிழின் வளர்ச்சித்துறையாகிய, 'அறிவியல் தமிழ்'; 'இணையதமிழ்' குறித்த பன்நோக்கு அணுகுமுறையிலான ஆய்வுச் சிந்தனை மேம்பாடு.
- வேலைவாய்ப்புக்குரிய சுயதிறன் மேம்பாட்டுடன், படைப்பாக்கத்திறன் மேம்பாடும் பெற்றிருத்தல்.
- சமுதாய மற்றும் வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக்கருவியாக இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.
- மொழிபெயப்புத்துறை சார்ந்த வேலைவாய்புத் திறன் பெற்றிருத்தல்

தாள்கள்வரிசையும்தேர்வுச்செயல்திட்டமும்பகுதி-I தமிழ்

பருவம்	தாள்	கற்பிக்கும் நோம்/வாரம்	தேர்வு மணிகள்	மதிப்பெண் அக/எமுக்கு	மொத்தம்	மதிப்பீடு
இரண்டு	II	4	3	40 / 60	100	4

அலகு - I : பக்தி இலக்கியம்

சைவம் - மூவர் தேவாரத்திலிருந்து தேர்ந்தெடுக்கப்பெற்ற15 பாடல்கள்

2. வைணவம் – ஆண்டாள் நாச்சியாரின் திருப்பாவையிலிருந்து 11 பாடல்கள்

அலகு – II : சங்கஇலக்கியம்

அ). எட்டுத்தொகை

நற்றிணை: 1. இலை இல பிடவம், திணை – முல்லை, ஆசிரியர் – விழிக்கட் பேதைப் பெருங்கண்ணனார். 2. மடல் மா ஊர்ந்து, திணை – குறிஞ்சி, ஆசிரியர் – மடல் பாடிய மாதங்கீரனார்.

குறுந்தொகை : 1. உள்ளார் கொல்லோ, திணை – பாலை, ஆசிரியர் – பெருங்கடுங்கோ. 2. யாரினும் இனியன், திணை – மருதம், ஆசிரியர் – வடமவண்ணக்கன் தாமோதரனார்.

ஜங்குறுநூறு : 1. நுண்ணேர் புருவத்த, திணை – குறிஞ்சி, ஆசிரியர் – கபிலர். 2. அவறொறுந் தேரை, திணை – முல்லை, ஆசிரியர் - பேயனார்.

பதிற்றுப்பத்து – ததைந்த காஞ்சி, ஆசிரியர் - பாலைக் கௌதமனார்.

பரிபாடல் - வையை - திரை இரும் பளிப் பௌவம், ஆசிரியர் - மையோடக் கோவனார்.

கலித்தொகை – கடும் புளல் கால் பட்டு, திணை – பாலை, ஆசிரியர் - பெருங்கடுங்கோ.

அகநானூறு - 1. ஆடு அமைக் குயின்ற, தினை – குறிஞ்சி, ஆசிரியர் – கபிலர். 2.யான் எவன் செய்கோ தோழி, தினை – பாலை, ஆசிரியர் – நோய்பாடியார். புறநானூறு - 1. சிறப்பில் சிதடு முறுப்பில், திணை – பொதுவியல்,

ஆசிரியர் – உறையூர் முதுகண்ணன் சாத்தனார்.

இளையரு முதியரும் வேறுபுலம் படா – ஆசிரியர் – கயமனார்.

ஆ). பத்துப்பாட்டு - சிறுபாண் ஆற்றுப்படை – கடையெழு வள்ளல்களின் சிறப்பு, நல்லியக்கோடனின் சிறப்பு, ஈகைத் திறம்.

அலகு - III : காப்பியங்கள்

1.மணிமேகலை –பாத்திரம் பெற்ற காதை – தீவதிலகை, மணிமேகலைக்குச் சொல்லியது, சிறைக்கோட்டம் அறக்கோட்டமாக்கிய காதை – மணிமேகலை வேண்ட, மாவண்கிள்ளி, சிறைக்கோட்டத்தை அறக்கோட்டமாக்கியது.

கம்பராமாயணம் - இலக்கியநயம் மிக்க, தேர்ந்தெடுக்கப்பெற்ற 41 பாடல்கள்.

அலகு - IV : கட்டுரைகள்

திருக்குறளில் மனிதவள மேலாண்மைக் கருத்துக்கள் - திருமிகு ஹரி விஜயலட்சுமி.

தமிழர் வளர்த்த நுண்கலைகள்: சிற்பமும் ஓவியமும் – தொ.மு. பாஸ்கரத் தொண்டைமான்.

சமயமும் தமிழும் – பேராசிரியர் அ.ச.ஞானசம்பந்தன்.

4.தமிழில் அறிவியல் – ஒரு பார்வை - பேராசிரியர் சிவகுமார்.

இன்றைய நெருக்கடிப் பிரச்சனைகள் - நீர்வளம் - முனைவர் ச. முத்துக்குமரன்.

அலகு - V : இலக்கணமும் மொழிப்பயிற்சியும் 1.எழுத்து, சொல், பொருள் இலக்கண எழுத்துப்பயிற்சிகள் 2.பொதுக் கட்டுரைகள் பாட தூல்; கற்பகச்சோலை – தமிழ் ஏடு, கற்பகம் பல்கலைக்கழகத் தமிழ்த் துறை வெளியீடு.

15ENU201

ENGLISH - II

(For all undergraduates students admitted from 2015 onwards)

Course Objectives:

- To enable the learners to acquire English language skills through literature.
- To familiarize them with English literature.
- To acquire Grammar knowledge.
- To help learners imbibe cultural values.
- To acquire skill of making correct sentences.
- To reflect originality on the application of soft skills and express in writing their views.

Course Outcomes:

- Learn to enjoy the ecstasy of literature.
- The select literary pieces will develop the confidence level of the learners.
- To get the social values.
- To know the importance of communication
- Get sound knowledge in English
- Trained to communicate well for business purpose.

UNIT I:

Prose: The Unexpected- Robert Lynd **Poetry**: The Village Schoolmaster – Oliver Goldsmith **Short Story:** The Lion's Share – Arnold Bennett **Vocabulary:** Homonyms **Grammar:** Irregular Verbs

UNIT II:

Prose: Travel by Train – J. B. Priestly **Poetry:** The Gift of India – Sarojini Naidu **Grammar:** Sentence patterns **Composition:** Reading Comprehension

UNIT III:

Prose: Women's Education is Almost More Important than the Education of Boys and Men – Indira Gandhi
Short Story: The Necklace – Guy De Maupassant
One-Act Play: The Referee – W.H. Andrews and Geoffrey Dearmer
Vocabulary: Similes
Grammar: Discourse Markers
Composition: Report Writing

UNIT IV:

Poetry: Ozymandias – P.B. Shelley **One-Act Play:** The Pot of Broth- W.B. Yeats **Vocabulary:** Collective Nouns **Grammar:** Correction of Sentences **Composition:** Picture Reading

UNIT V:

Short Story: The Silver Butterfly– Pearl S. Buck One-Act Play: The Bear – Anton Chekov Vocabulary: Acronyms Grammar: Question Tags Composition: Drafting Advertisement

Prescribed Texts

Wings of Communication 2014. Board of Directors. Emerald Publishers: Chennai

Reference

Syamala, V. English for Communication. 2006. Emerald Publishers: Chennai.

Semester-II L T P C 15CSU201 OBJECT ORIENTED PROGRAMMING WITH C++ 4 1 0 5

Course Objectives

- To understand how C++ improves C with object-oriented features.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To learn how to overload functions and operators in C++.
- To learn how to design and implement generic classes with C++ templates.
- To learn how to use exception handling in C++ programs.

Course Outcomes(COs)

- 1. Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- 2. Able to make use of objects and classes for developing programs.
- 3. understand the concept of data abstraction and encapsulation
- 4. Able to use various object oriented concepts to solve different problems
- 5. Using inheritance and virtual functions to implement dynamic binding with polymorphism.
- 6. Ability to use exception handling in debugging the programs

UNIT-I

Principles of Object Oriented Programming: A look at Procedure-oriented programming - Basic concepts of object oriented programming – benefits of OOP – structure of c++ program – Declaration of variables. **Control statements:** Decision making statements – if...Else, jump, go to, break, continue- switch case statements – do-while – while statement, for statement. Inline functions – function overloading. Design an array of 10 doubles and set all of them to 1.0.

UNIT-II

Classes and Objects: Specifying a class – defining member functions Inside the Class – Defining member functions outside the class - static data members – static member functions - array of objects –friendly functions. **Constructors and destructors:** Constructors – multiple constructors in a class – constructors with default arguments - copy constructor – destructors

UNIT-III

Operator Overloading: Defining operator overloading – overloading unary operators – overloading binary operators – overloading binary operators using friends – type conversions. **Inheritance:** Inheritance – defining derived classes – single, multilevel, multiple, hierarchical inheritance- hybrid inheritance – virtual base classes – abstract classes.

Design a code to perfrom arithmetic and comparison operation using operator overloading.

UNIT-IV

Pointers: Pointers to objects – this pointer – pointers to derived classes – virtual function. **Managing console I/O operations:** C++ streams – C++ stream classes – unformatted I/O operations – formatted console I/O operations – Managing output with manipulators.

UNIT-V

Files: Classes for file stream operations – opening and closing a file – sequential input and output operations – updating a file random access – command line arguments. **Templates:** Templates – class templates – function templates – member function templates.

TEXT BOOK

 Ashok N. Kamthane. 2009. Object Oriented Programming with ANSI and Turbo C++. 2nd Edition, Pearson Education, New Delhi. (Page Nos.:1-14, 19-32, 96-113,115-130,144-164, 171-187, 201-240, 251-281,290-317)

REFERENCES

- 1. Balagurusamy. E. 2007. Object Oriented Programming with C++. 3rd Edition, Tata McGraw Hill publishing company Ltd, New Delhi.
- 2. Chandra .B. 2005. Object Oriented Programming using C++, 2nd Edition, Narosa Publishing House, New Delhi
- Jesse Liberty and David B. Horvath. 2005. SAMS teach yourself C++ in 24 hours, 4th Edition, Pearson Education, New Delhi. (Page Nos.:125-149, 25-48,496-519)
- 4. John R. Hubbard. 2006. Programming with C++, 2nd Edition, Tata McGraw Hill Publishers, New Delhi.

WEB SITES

- 1. http://www.cplusplus.com/doc/tutorial/
- 2. www.cplusplus.com/
- 3. www.cppreference.com/

Semester-II L T P C

15CSU211 OBJECT ORIENTED PROGRAMMING WITH C++ LAB 0 0 5 3 Course Objectives

- To understand how C++ improves C with object-oriented features.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To learn how to overload functions and operators in C++.
- To learn how to design and implement generic classes with C++ templates.
- To learn how to use exception handling in C++ programs.

Course Outcomes(COs)

- 1. Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- 2. Able to make use of objects and classes for developing programs.
- 3. understand the concept of data abstraction and encapsulation
- 4. Able to use various object oriented concepts to solve different problems
- 5. Using inheritance and virtual functions to implement dynamic binding with polymorphism.
- 6. Ability to use exception handling in debugging the programs

List of programs

- 1. Create a class **Patient** with necessary data members. In the main () program, have the facility to
 - Store the details of n inpatients and outpatients
 - Display the details in a neat format
- 2. Create two classes **British** and **Metric** to store the measurements of distance in the British (feet and inches) and Metric (meters and centimeters) systems respectively. In the main () program, perform the following:
 - Get two measurements: one in British and the other in Metric
 - Ask the user in which system (British or Metric) (s) he wants the output.
- 3. Add two input measurements and print the result according to the user's choice Create a class **Date** whose data members are Day, month, and Year. Write necessary member functions and perform the following operations using overload operator.
 - Increment a date by a day
- 4. Create a class **Date** whose data members are Day, month, and Year. Write necessary member functions and perform the following operations using overload operator.
 - Compares two dates
- 5. Create a class **String** that has a character array as a data member and perform the following operations using overloaded operators.
 - '+' To add two strings
 - '==' To compare two strings
- 6. Create a class **Computer** and derive two classes **Client** and **Server** from it. In the main () program, get the data about n clients and servers and print it back in a neat format.

7. Create a class **Shape** that contains two data members of type double to hold the two dimensions of the shape. Derive 3 more classes' **Circle**, **Rectangle** and **Triangle** from the class Shape. Using appropriate member functions, get the values, calculate and print the area of different shapes using dynamic binding.

Hint:- Write 2 member functions in all the derived classes: one to set the data and the other to calculate and display the area.

- 8. Create a class **Staff** that contains the name, designation, and years of experience of a staff member of a college. Using containership, create two more classes **TeachingStaff** and **NonTeachingStaff** according to the following specifications. In addition to the properties of the staff class, the TeachingStaff class should contain the highest qualification, the staff member possesses and the departments he belongs to. The NonTeachingStaff class needs to contain the properties of Staff only. In the main (), get data about some of the teaching and NonTeachingStaff members of your college and print the details in neat format.
- 9. Create a class **Address** as whose data members are Name, Street, City, Pincode and Phone Number of a person. In the main () program, using array of pointers, get addresses of n persons, sort it in alphabetical order of names and display it back in a neat format.
- 10. Create a class that copies the content of a text file into another file. Write the program in such a way that the program accepts command line arguments and make the program to execute in a way exactly the copy command in DOS.
- 11. Create a class **Student** that could have the name, register number and marks in the subjects of the semester. Have the program to perform the following operations:
 - Store the data about n students in a data file.
 - Print the mark list of each student whenever requested.
 - Add details about some more students at any time.
- 12. Sort an integer and a floating –point array using function template.

- To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- To provide experience to integrate hardware and software for microcontroller applications systems.
- To learn the various Concepts of Embedded System
- To acquire knowledge about microcontrollers embedded processors and their applications.
- T o develop the Programming Skills in 8051 Microcontroller.
- To provide a strong knowledge in the field of Real Time Operating System.

Course Outcomes

- 1. Ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
- 2. Ability to write the programs for microcontroller.
- 3. Understand the concepts of embedded systems
- 4. Understand the role of embedded systems in industry.
- 5. Understand the design concept of embedded systems
- 6. Integrate hardware and software for microcontroller applications systems.

UNIT I – 8051 Microcontroller

Introduction to Microcontroller and Embedded Processors – Microcontroller for Embedded Systems – Overview of 8051 Family – 8051 Architecture – 8051 flag bits and PSW Register - Register Bank and Stack.

UNIT II –8051 Programming

8051 Assembly and C Programming – Instruction Set –Address Modes - Loop and Jump Instructions - Arithmetic Instruction - Logic Instructions - Single Bit Instructions. Data Types and Directives - I/O Port Programming.

UNIT III – Internal Peripherals of 8051

Basic Registers of Timer - Programming 8051 Timer-Counter Programming – Basics of Serial Communication – 8051 Connection to RS232 - 8051 Serial Communication Programming – 8051 Interrupts - Programming External Hardware Interrupts.

UNIT IV – Applications

Interfacing LCD to the 8051 – Interfacing ADC – Sensors to 8051- Interfacing Stepper Motor - 8051 Interfacing to the Keyboard - Interfacing DAC to the 8051.

UNIT V – Real-Time Operating System

Survey of Software Architecture: Round Robin-Round Robin with Interrupts-Function – Queue Scheduling Architecture - Introduction of RTOS - RTOS Architecture -Task and Task States - Task and Data - Semaphores and Shared Data - Message Queues, Mailboxes and Pipes - Timer Function – Events - Memory Management.

TEXT BOOK

- 1. The 8051 Microcontroller and Embedded Systems, Mohammed Ali Mazidi and Janice Gillispie Mazidi, Pearson Education, Singapore, Third Edition, 2008.
- 2. The 8051 Architecture and its Applications, Ayala, Prentice Hall of India, Sixth Edition, 2010, New Delhi.

REFERENCES

- 1. Embedded Microcontroller, Intel Manual Volume I and II, 2008.
- 2. The 8051 Microcontroller and Embedded Systems, Dr. Rajiv Kapadia, Jaico, Publishing House, First Edition, 2004, Mumbai.

- To learn the fundamentals of PC Hardware.
- To develop base knowledge in the installation of peripheral devices.
- To get a detailed knowledge of all the hardware components that make up a computer
- To understand the different interfaces required for connecting the hardware devices.
- To understand the components on the motherboard
- To provide a strong knowledge in Trouble shooting of PC

Course Outcomes (COs)

- 1. Understand the modern computer organization, processor and memory concept, Peripherals and recent system architecture
- 2. Identify the existing configuration of the computers and peripherals for upgrading the same as and when required.
- 3. Develop base knowledge in the installation of peripheral devices.
- 4. Knowledge of all the hardware components that make up a computer
- 5. Understand the different interfaces required for connecting the hardware devices.
- 6. Trouble shoots PC when required.

UNIT I – Micro Computer System

Introduction to Micro Computer System – Computer Organization – Number Systems and Codes Memory – Arithmetic and Logic Unit – Control Unit.

UNIT II – Peripheral Devices

Introduction to Peripheral Devices – Keyboard – CRT Display monitor – Printer – Magnetic Storage Devices – Floppy Disk Drive – Hard Disk Drive – Peripherals Interfaces and Controller – Keyboard Interface

UNIT III – Display Adapter

CRT Display — CRT Controller –Auxiliary Subsystems – Data Communication fundamentals – Serial Port in PC – Real time clock (RTC) – Magnetic Tape Subsystems – LAN – Memory Expansion Options

UNIT IV – Installation and Preventive Maintenance

Pre Installation Planning – Installation Practice – Routine Checks – Special Configurations – Memory Up Gradation

UNIT V – Trouble shooting

Troubleshooting – Computer faults – Nature of faults – Types of Faults Diagnostic Programs and Tools — Faults in Elimination Process – Systematic Troubleshooting – POST (Power on Self-Test)

TEXT BOOK

- 1 IBM PC and Clones, B. Govindarajalu, Tata McGraw Hill Publishing Company, Second Edition, 2011.
- 2 Introduction to PC Hardware and Troubleshooting, Michael Meyers, The Mike Meyers' Computer Skills, McGraw Hill, First Edition, 2003.

REFERENCES

1 Hardware and Software of Personal Computers, Sanjay K. Bose, New Age International Publishers, 1999.

- To apply the fundamentals of assembly level programming of microprocessors.
- To build a program on a microprocessor using arithmetic & logical instruction set of 8086.
- To develop the assembly level programming using 8086 loop instruction set.
- To write programs based on string and procedure for 8086 microprocessor.
- To analyze abstract problems and apply a combination of hardware and software to address the problem
- To make use of standard test and measurement equipment to evaluate digital interfaces

Course Outcomes(COs)

- 1. Apply the fundamentals of assembly level programming of microprocessors.
- 2. Build a program on a microprocessor using arithmetic & logical instruction set of 8086.
- 3. Develop the assembly level programming using 8086 loop instruction set.
- 4. Write programs based on string and procedure for 8086 microprocessor.
- 5. Analyze abstract problems and apply a combination of hardware and software to address the problem
- 6. Make use of standard test and measurement equipment to evaluate digital interfaces

UNIT I – Introduction to 8-bit Microprocessor

Introduction to 8085 – Pin Diagram –Architecture – Demultiplexing the Bus –Generation of Control Signals – Fetching, Decoding and Execution of Instruction – Instruction Timing and Status Flag.

UNIT II – Addressing Modes

Instruction Set – Addressing Modes – Instruction Format – Simple Program – Memory Read Machine Cycle – Memory Unit s Machine Cycle.

UNIT III- Interfacing Concepts

Peripheral I/O Instructions – Device Selection And Data transfer – Types of Data Transfer - Input Interfacing – Input Interfacing Using Decoders – Output Interfacing: LED and 7 Segment Display – Interfacing Memory.

UNIT IV Peripheral Devices

Introduction to Programmable Peripheral Interface 8255 – Pin Diagram –Architecture – Modes of Operation: I/O and BSR – Architecture and Operation of 8251(USART). Architecture and Operation of Programmable Interrupt Controller (8259) – Architecture of 8254(8253) Programmable Interval Timer/Counter –DMA Controller(8279).

UNIT V- Applications

Time Delay Program – Traffic Light Control System – Water Level Controller – Stepper Motor Control – Interfacing DAC –Interfacing ADC – Temperature Measurement.

TEXT BOOK

- 1. Microprocessor Architecture, Programming and Application with 8085, Ramesh S Gaonkar, Penram International Publishing, Fourth Edition, 2000. New Delhi.
- 2. Microprocessor, Microcomputer, Microcontroller and Interfacing, M.K.Gupta, Paragon International Publisher, 2006, First Edition, New Delhi.

REFERENCES

- 1. Introduction to Microprocessors, Adithya P.Mathur, Tata MCGraw Hill Publishers, Second Edition, 2004, New Delhi.
- 2. Fundamentals of Microprocessor and Microcontroller, Ram.B, Dhanpat Rai Publication, Second Edition, 2000, Mumbai.

- To have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- To provide experience to integrate hardware and software for microcontroller • applications systems.
- To learn the various Concepts of Embedded System
- To acquire knowledge about microcontrollers embedded processors and their • applications.
- T o develop the Programming Skills in 8051 Microcontroller. •
- To provide a strong knowledge in the field of Real Time Operating System.

Course Outcomes

- 1. Ability to understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
- 2. Ability to write the programs for microcontroller.
- 3. Understand the concepts of embedded systems
- 4. Understand the role of embedded systems in industry.
- 5. Understand the design concept of embedded systems
- 6. Integrate hardware and software for microcontroller applications systems.

List of Experiments

(Any 8 Experiments)

- 1. Addition of 8/16 Bit Array of Data
- 2. Subtract of 8/16 Bit Array of Data
- 3. Multiplication & Division
- 4. Ones and Two's Compliment
- 5. Data Transfer using Parallel Port
- 6. Sorting of Numbers
- 7. Stepper Motor Interface
- 8. Wave Form Generation
- 9. Biggest and Smallest Number in an Array
- 10. D/A Converter

15CSU212B PC HARDWARE & TROUBLE SHOOTING LAB

Course Objectives

- To learn the fundamentals of PC Hardware.
- To develop base knowledge in the installation of peripheral devices.
- To get a detailed knowledge of all the hardware components that make up a computer
- To understand the different interfaces required for connecting the hardware devices.
- To understand the components on the motherboard
- To provide a strong knowledge in Trouble shooting of PC

Course Outcomes (COs)

- 1. Understand the modern computer organization, processor and memory concept, Peripherals and recent system architecture
- 2. Identify the existing configuration of the computers and peripherals for upgrading the same as and when required.
- 3. Develop base knowledge in the installation of peripheral devices.
- 4. Knowledge of all the hardware components that make up a computer
- 5. Understand the different interfaces required for connecting the hardware devices.
- 6. Trouble shoots PC when required.

List of Experiments

(Any 8 Experiments)

- 1. Identifying External Ports and Interfacing
- 2. Identifying PC cards and Interfacing.
- 3. Assembling of PC
- 4. Preventive Maintenance of a PC
- 5. Trouble Shooting of SMPS
- 6. Keyboard Servicing
- 7. Study of CRT
- 8. Communication and Bus Interfacing
- 9. Partitioning and Formatting Hard disks.
- 10. Installing System And Application Software

Semester-IIL T P C15CSU212CMICROPROCESSOR LAB0 0 3 2

Course Objectives

- To apply the fundamentals of assembly level programming of microprocessors.
- To build a program on a microprocessor using arithmetic & logical instruction set of 8086.
- To develop the assembly level programming using 8086 loop instruction set.
- To write programs based on string and procedure for 8086 microprocessor.
- To analyze abstract problems and apply a combination of hardware and software to address the problem
- To make use of standard test and measurement equipment to evaluate digital interfaces

Course Outcomes(COs)

- 1. Apply the fundamentals of assembly level programming of microprocessors.
- 2. Build a program on a microprocessor using arithmetic & logical instruction set of 8086.
- 3. Develop the assembly level programming using 8086 loop instruction set.
- 4. Write programs based on string and procedure for 8086 microprocessor.
- 5. Analyze abstract problems and apply a combination of hardware and software to address the problem
- 6. Make use of standard test and measurement equipment to evaluate digital interfaces

List of Experiments

(Any 8 Experiments)

MICROPROCESSOR LAB

- 1. Addition of 8/16-bit and Array of Data
- 2. Subtraction of 8/16-Bit Number
- 3. Multiplication of 8-Bit Number
- 4. Division of 8-bit Number
- 5. Fill and Transfer an Array of Data.
- 6. Ascending and Descending of an Array.
- 7. Data Transfer using Parallel Ports.
- 8. Stepper Motor Interface
- 9. Traffic Light Controller
- 10. A/D Convertor and D/A Convertor
SEMESTER II

15FCB201FOUNDATION COURSE - B
ENVIRONMENTAL STUDIES2H - 1CTotal hours/week: L:2 T:0 P:0Marks: Internal: 100 External: - Total:100

Course Objectives

- To create the awareness about environmental problems among people.
- To develop an attitude of concern for the environment.
- To motivate public to participate in environment protection and improvement.
- To understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- To apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- To reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Course Outcomes (COs)

- 1. Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- 2. Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
- 3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- 4. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- 5. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- 6. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

UNIT - I: Eco system and natural resources: Environment – Definition – components - Ecosystem -Definition, Concept, Scope, importance, structure and functions of ecosystem. Energy flow, Ecological succession. Food chains and food webs. Classification of ecosystem. Natural resources: Forest resources; water resources

UNIT - II: Environmental pollution: Cause, effects and control measures of Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards pollution. Solid waste management.

UNIT - III: Biodiversity and its conservation: Introduction- Definition, genetic, species and ecosystem diversity, biogeographical classification of India- Value of biodiversity: Consumptive, productive uses; social, ethical, aesthetic and option values. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

UNIT - IV: Social issues and the environment: Urban problems related to energywater conservation and management -Rain water harvesting- water shed management. Resettlement and Rehabitilisaion. Natural resources and associated problems and sustainable utilization. Environmental Education.

UNIT - V: Environment ethics: Environmental Ethics - Gender equity, ethical basis of environment education and awareness, conservation ethic and traditional value systems of India. Valuing nature, cultures, social justice, Human heritage, equitable use of resources, preserving resources for future generation, common property resources, Ecology and its uses and its degradation, Introduction to Environmental Protection Act (EPA).

TEXT BOOKS

- 1. Agarwal, K.M., P.K. Sikdar and S.C. Deb, 2002. A Text Book of Environment, Mac Millan India Ltd, Kolkatta, India.
- 2. Kotwal, P.C. and S. Banerjee, 2002. Biodiversity Conservation In Managed forest and protected areas, Agrobios, India.

REFERENCES

- 1. Singh, M.P., B.S. Singh and Soma S. Dey, 2004. Conservation of Biodiversity and Natural Resources. Daya Publishing House, Delhi.
- 2. Uberoi, N.K., 2005. Environmental Studies, Excel Books Publications, New Delhi, India.
- 3. Shaw, R and Krishnamurthy, R.R. 2009. Disaster management: global challenges and local solutions Universities Press (India) Private Ltd, Hyderabad.
- 4. Sorokin Pitirim. A, 1942. Man and Society In Calamity. New York: Dutton, 1942
- 5. Patrick L.Abbott, 2008. Natural Disasters, Mc Graw Hill, New York. Page: 1-7.

- Students will be able to apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.
- To achieve the analytical and reasoning competencies and to improve their communication and presentation skills
- To impact knowledge on both Aptitude and Soft skills to the students
- To actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- To critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
- To reinforce competencies in soft skills which are crucial in a social setting

Course Outcomes(COs)

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

- 1. Understand the basic concepts of QUANTITATIVE ABILITY
- 2. Understand the basic concepts of LOGICAL REASONING Skills
- 3. Acquire satisfactory competency in use of VERBAL REASONING
- 4. Actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- 5. Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- 6. Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

UNIT - I

Introduction to Quantitative Aptitude, Speed Maths, Problems on Numbers, Averages, Ratios and Proportions, Problems on Ages

UNIT - II

Number Series, Blood Relation, Image Analysis, Direction Sense, Syllogism, Coding and Decoding

UNIT – III

Percentages, Data Interpretation, Profit and Loss, Simple Interest and Compound Interest

UNIT – IV

Parts of Speech, Tense, Subject Verb Agreement, Active and Passive Voice, Articles, Prepositions

UNIT - V

Conditional Clause, Degrees of Comparison, Goal Setting, Interpersonal Skills

15ENU301

ENGLISH - III

(For undergraduates students admitted from 2015 onwards)

Course Objectives

- To develop confidence to respond in English during situations where the use of English is imperative.
- To develop fluency in actual conversation in the English language.
- To develop speech skills necessary for confident and intelligent participations in Group Discussions and develop skills related to teamwork in work places.
- To develop confidence to respond in English during situations where the use of English is imperative.
- To develop fluency in actual conversation in the English language.
- To develop knowledge about business communication.

Course Outcomes (COs)

- 1. Students learnt the basics and purposes of listening skill.
- 2. Students understand importance of speaking.
- 3. Students developed the speaking skills on telephone, business and also in travel
- 4. Learnt some effective vocabulary learning strategies.
- 5. Students will able to communicate clearly and effectively and handle their day to day affairs well with their knowledge of language skills.

UNIT I

Listening: Listening comprehension – Listening for Specific Information –Note Taking – Interpreting Charts and Diagrams.

UNIT II

Speaking: Essentials of effective communication – Greeting and Introducing – Making requests – Asking for permission – Giving and Denying Permission – Offering and Accepting Help – Asking for and Declining Help – Giving Instructions and Orders - Talking about likes and dislikes.

Telephone Skills – Understanding telephone conversation – handling calls – leaving messages –making requests - giving instructions and orders

Discussion Skills – Giving your opinion – agreeing and disagreeing – Making suggestions – Interrupting – questioning – reporting – Dealing with questions. (Completing dialogues)

UNIT III

Reading: Reading – Reading with a purpose –Skimming and Scanning – locating main points – reading critically – Sequencing of sentences – Reading comprehension.

UNIT IV

Writing: Paragraph Writing – Descriptive and Narrative. Safety Instructions/ Suggestions. Expansion of Abbreviations – Spellings- Report writing.

Translation- Translating short sentences and passages from English to Tamil and from Tamil to English.

UNIT V

Vocabulary: Improve English vocabulary: Synonyms – Antonyms – Prefixes – Suffixes – Idioms – Collocations – Different types of English – British and American (Choose the best answer type from a database of 50 words each for each topic)

Functional Grammar: Forming questions, getting answers – Articles – Parts of Speech – Punctuation – Common mistakes in English (Homophones)(Exercise based)

Reference Books:

- 1. Language in Use: Kenneth Anderson, Cambridge University Press.
- 2. Study Speaking: A course in Spoken English for Academic Purpose: Kenneth Anderson, Joan MacLean and Tony Lynch, Cambridge University Press, 2008.
- 3. Spoken English Part I & II (for Tamil speakers), Orient Longman Pvt. Ltd.
- Dr. J. John Love Joy, Dr.Francis M.Peter S.J. "Lets Communicate Basic English for Everyone", Vaigarai Publications, 1st edition, Dindigul 2007.

15CSU301 DATA STRUCTURES AND ALGORITHMS

Course Objectives

- To understand the fundamental concepts of data structures
- To Learn linear data structures lists, stacks, and queues •
- To apply Tree and Graph structures
- To understand and apply sorting, searching algorithms •
- To analyze algorithms using big-Oh notation •
- To develop application using data structures •

Course Outcomes (COs)

Upon completion of this course, the student will be able to:

- 1. Implement abstract data types for linear data structures.
- 2. Apply the different linear and non-linear data structures to problem solutions.
- 3. Analyze the applications of tree.
- 4. Implement graph theory over various data structures.
- 5. Critically analyze the various sorting algorithms.
- 6. Apply searching algorithms over various data structures.

UNIT I

Introduction: Introduction to Algorithms- Analyzing Algorithms- Creating the Algorithms; Arrays: Representation of Arrays- Stacks and Oueues- Multiple Stacks and Circular Queue- Sparse Matrices- Polynomial Addition; Infix to Postfix Conversions-**Evaluation of Expression**

Internal Sorting: Insertion sort – Quick sort- Selection sort – Shell sort – 2-Way Merge sort

Searching: Linear Search

UNIT II

Linked list: Singly Linked List: Insertion and Deletion in Singly Linked List- Linked Stacks and Queues;

Doubly Linked List: Insertion and Deletion in Doubly Linked List - Sparse Matrices-Polynomial Addition;

Dynamic Storage Management: Allocating blocks- Freeing Blocks;

UNIT III

Non Linear Structures: Trees: Basic Terminology; Binary Trees: Binary Tree **Representations- Binary Tree Traversals - Threaded Binary Trees** Searching and Sorting: Binary Search-Heap sort Application of Trees: B Trees- Tree indexing.

UNIT IV

Non Linear Structures: Graphs: Basic Terminology- Graph Representation- Traversals-Spanning Tree- Kruskal's Algorithm

Applications of Graph: Shortest Path: Single Source All Destinations- All Pairs Shortest

UNIT V

Sorting: External Sorting: K-Way Merge Sort- Sorting with tapes: Balanced Merge sort, Polyphase Merge Static Tree – Dynamic Tree Hash Tables: Hashing Functions – Overflow handling.

TEXT BOOK

1.Ellis Horowitz and Sartaj S Shani. .2010. Fundamentals of Data Structures, 2nd Edition ,Galgotia Publications, , New Delhi.

REFERENCES

- 1. Kirshnamoorthy. 2008. Data Structures Using C, Tata Mcgraw Hill Publishing Company Limited, New Delhi.
- 2.Kruse R. 2007. Data Structures & Program Design In C, 2nd Edition, Prentice-hall Of India Pvt Ltd, New Delhi.
- 3.Murugan .M. Graph Theory and Algorithms,1st Edition, Muthali Publications house, Chennai.
- 4.Robert L. Kruse.2000. Data Structures and Program Design, 3rd Edition, Printice- Hall of India, Delhi.
- 5.Seymour Lipschutz.1986. Theory and Problems of Data Structures, 2nd Edition, McGraw Hill, New Delhi.

WEB SITES

http://en.wikipedia.org/wiki/Data_structure http://www.cs.sunysb.edu/~skiena/214/lectures/ www.amazon.com/Teach-Yourself-Structures-Algorithms

- To understand the fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To use the Java SDK environment to create, debug and run simple Java programs.
- To use Java in various technologies in different platforms.
- To understand the fundamental of Packages and access modifiers and interface in java.
- To understand the fundamental of Exception Handling and AWT component and AWT classes.

Course Outcomes (COs)

- 1. Student will obtain knowledge of the structure and model of the Java programming language.
- 2. How to use the Java programming language for various programming technologies (understanding)
- 3. Develop software in the Java programming language (application)
- 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
- 5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
- 6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

UNIT-I

Introduction to Object Oriented Programming: Object Oriented Paradigm and Concepts-Structured versus Object Oriented Approach. Java Language: Features of Java -Environment-Java Architecture-Java Development Kit-Types of Java Program. Variable Declaration and Arrays: Data Types-Java Tokens –Variable Declaration – Type Casting and Conversion – Arrays, Operators, And Control Statements: Selection Constructs – Iteration Constructs –Jump Statements.

Design various approach to determine the integer is prime or not.

UNIT-II

Introduction to classes: Instance variables, Class variables, Instance Methods, Constructors, Class methods, Declaring Objects, Garbage Collection, Method Overloading - Constructor Overloading - This Reference. Inheritance: Super class variables- Method Overriding - final Keyword, Abstract Classes and Interfaces.

UNIT-III

Packages and Access Modifiers: Package Declaration – import statement - Access Protection. Strings: Creation – Operation on strings - Character Extraction Methods – Comparison –Searching and Modifying –String Buffer Class. Collection and Utilities: Collection of Objects –CORE Interfaces and Classes –Iterators – List, Set, Map Implementations.

Design a code to remove multiple spaces in a string.

UNIT-IV

Input Output Classes: I/O Operations –Hierarchy of Classes – File class – Input Stream, Output Stream, FilterInputStream, FilterOutputStream, Reader and Writer classes – Random Access File class –Stream Tokenizer. Applets: Basics – Life Cycle –Methods – Graphics Class- Color, Font, and Font Metrics Class.

UNIT-V

Exception Handling: Fundamentals – Hierarchy of Classes – Types of Exception. Multithreaded Programming: Thread Model – Runnable Interface - Thread Class-Thread Life Cycle. AWT Components: AWT Classes – Basic Component and Container Classes – Frame Window in an Applet.

Design a code to open notepad.

TEXT BOOK

1. ISRD Group. 2007. Introduction to Object Oriented Programming through Java, 1st Edition, Tata McGraw Hill, New Delhi.

(Page Nos.:1-49, 54-115 161-172,177 -189, 218-242, 253 -271, 292-306, 120-149, 311-325)

Herbert Schildt. 2011. Java Complete Reference, 8th Edition, Tata McGraw Hill, New Delhi.

REFERENCES

- 1. Deitel H.M. and P.J.Deitel. 2005. Java, How to Program, 6th Edition, Pearson Education, New Delhi.
- 2. Somasundaram Dr. S. 2004. Java Programming, 1st Edition. Techmedia, New Delhi.
- 3. Somasundaram Dr. K. 2008. Programming in Java 2, 1st Edition. Jaico publishing house, New Delhi.

WEB SITES

- 1. java.sun.com/docs/books/tutorial/
- 2. www.en.wikipedia.org/wiki/Java
- 3. www.java.net/

- To understand the fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To use the Java SDK environment to create, debug and run simple Java programs.
- To use Java in various technologies in different platforms.
- To understand the fundamental of Packages and access modifiers and interface in java.
- To understand the fundamental of Exception Handling and AWT component and AWT classes.

Course Outcomes (COs)

- 1. Student will obtain knowledge of the structure and model of the Java programming language.
- 2. How to use the Java programming language for various programming technologies (understanding)
- 3. Develop software in the Java programming language (application)
- 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)
- 5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)
- 6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (evaluation)

Write a java program to solve the following:

- 1. Create an employee package to maintain the information about the employee. Use constructors to initialize the employee number and use overloading method to set the basic pay of the employee. By using this package, create a Java program.
- 2. Create a set of classes with the relationship as shown in the diagram and use inheritance relationship to define the sub classes.

Get and display the details of some of the two and four wheelers and display them in a neat format.

- 3. Create a frame with user specific size and position it at user specific position (use command line argument). Then different shapes with different colors (use menus).
- 4. Create an applet for a calculator application.



Vehicle

- 5. Java program to maintain the student information in text file.
- 6. Animate images at different intervals by using multi-threading concepts.
- 7. Write a program to accept more strings and arrange them in alphabetical order.
- 8. Write a program to create a window and draw cross lines.
- 9. Write a program to create an applet and draw the shapes.
- 10. Write a program to create a window with a background color and display a message.
- 11. Write a program for multiplication tables by multithreading.
- 12. Write a program to create an exception for marks out of bounds. If mark is greater than 100 throw an exception.

15CSU303 NUMERICAL METHODS

Course Objectives

This course enables the students to

- To understand the basic concepts of numerical methods
- To develop the mathematical skills in the areas of numerical methods.
- To understand numerical techniques as powerful tool in scientific computing.
- To provide suitable and effective methods called Numerical Methods, for obtaining approximate representative numerical results of the problems.
- To solve problems in the field of Applied Mathematics, Theoretical Physics and Engineering which requires computing of numerical results using certain raw data.
- To solve complex mathematical problems using only simple arithmetic operations. The approach involves formulation of mathematical models of physical situations that can be solved with arithmetic operations.

Course Outcomes (COs)

On completion of the course students will be able to

- 1. Apply Numerical analysis which has enormous application in the field of Science
- 2. Familiar with numerical integration and differentiation, numerical solution of ordinary differential equations.
- 3. Familiar with calculation and interpretation of errors in numerical method.
- 4. Develop and apply the appropriate numerical techniques for the problem, interpret the results, and assess accuracy.
- 5. Understand the basics of Numerical Differentiation & Integration and numerical solutions of ordinary differential equations.
- 6. Understand the concepts of difference operators and the use of Interpolation.

UNIT I

Solution of algebraic and transcendental equations: Bisection method –Regula Falsi method – Newton Raphson method. Polynomoial Equations – Graeffe's root squaring method.

UNIT II

Solution of simultaneous linear algebraic equations: Gauss elimination method – Gauss Jordan method – Method of triangularization – Gauss-Jacobi method – Gauss-seidel method.

UNIT III

Interpolation: Gregory Newton Forward and Newton Backward interpolation formula – Interpolation with unequal intervals — Lagrange's interpolation formula – Inverse interpolation formula.

UNIT IV

Numerical Differentiation and Integration: Newton's Forward and backward differences to compute derivatives – Trapezoidal rule, Simpson's 1/3 &3/8 rule.

UNIT-V

Numerical methods for solving ordinary differential equations – Taylor series(I order) – Euler and Modified Euler method – Runge kutta methods (II order , III order and IV order).

TEXT BOOK

1. Venkataraman .M.K., Fifth Edition,2001. Numerical Methods in Science and Engineering, National publishing Company ,Madras. (Unit I – V)

REFERENCES

- 1. Kandaswamy. P., Thilagavathy K., and K.Gunavathy., 2013 .Numerical Methods, S. Chand & Company Ltd., New Delhi.
- 2. Vedamurthy V.N.,N.CH.S.N.Iyenger., 1999. Numerical Methods, Vikas Publishing House Pvt Ltd, New Delhi.

- To provide an understanding of the fundamental principles in compiler design
- To provide the skills needed for building compilers for various situations that one may encounter in a career in computer science.
- To learn the process of translating a modern high-level language to executable code required for compiler construction.
- To understand fundamentals of compiler and identify the relationships among different phases of the compiler.
- To understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics.
- To analyze & implement required module, which may include front-end, backend, and a small set of middle-end optimizations.

Course Outcomes(COs)

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

- 1. Specify and analyze the lexical, syntactic and semantic structures of advanced language features
- 2. Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
- 3. Write a scanner, parser, and semantic analyzer without the aid of automatic generators
- 4. Turn fully processed source code for a novel language into machine code for a novel computer
- 5. Describe techniques for intermediate code and machine code optimization
- 6. Design the structures and support required for compiling advanced language features.

UNIT I

Introduction: Compilers - Analysis of the source program - phases of compiler - cousins of the compiler - Grouping of phases.

Simple one - pass compiler: - Overview - syntax definition - syntax directed translation - parsing - a translator for simple expressions - Incorporating a symbol table - symbol tables

UNIT II

Lexical Analysis: The role of the Lexical analyzer - Input buffering - specification of tokens - recognition of tokens.

Syntax Analysis: The role of the parser - context free grammars - writing a grammar - Top down parsing - Bottom up parsing - operator precedence parsing - LR parsers.

UNIT III

Syntax directed translation: Syntax directed definitions - construction of syntax trees -Bottom up evaluation of S-attributed definitions - L attributed definition. Type checking -Type systems - specification of simple type checker.

UNIT IV

Runtime Environments: Source language issues - storage organization - storage allocation strategies. Intermediate Code Generation: Intermediate languages - declarations - assignment statements.

UNIT V

Code Generation: Issues in the design of a code generator - The target machine - runtime storage management - Basic blocks and flow graphs.

Code optimization: Introduction - The principle sources of optimization.

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi and Jeffrey D Ullman, 2003, "Compilers, principles, Techniques and Tools", 1st Edition, Addison Wesley Publishing Company, New Delhi.

REFERENCES

1. Dhamedhere .D.M, 2003, "Compilers Construction Principles and Practice", 2nd Edition, Macmillan publication Ltd, New Delhi.

WEBSITES

- 1. www.cs.bilkent.edu.tr/~ilyas/Courses/CS416/
- 2. web.cecs.pdx.edu/~sheard/course/Cs321/notes/index.html
- 3. www.personal.kent.edu/~rmuhamma/Compilers/compiler.html
- 4. engineeringppt.blogspot.com/2009/08/compiler-design-ppt.html

Semester-III	Semester-III	
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- To introduce students the concepts and principles of system programming
- To provide students the knowledge about both theoretical and practical aspects of system programming, teaching them the methods and techniques for designing and implementing system-level programs.
- To train students in developing skills for writing system software with the aid of sophisticated OS services, programming languages and utility tools.
- To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- To describe the various concepts of assemblers and macroprocessors.
- To understand how linker and loader create an executable program from an object module created by assembler and compiler.

Course Outcomes(COs)

- 1. Understand different components of system software.
- 2. This course enables for good understanding of the role of system programming and the scope of duties and tasks of a system programmer.
- 3. This course enables to learn the concepts and principles of developing systemlevel software (e.g., compiler, and networking software)
- 4. Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- 5. Describe the various concepts of assemblers and macroprocessors.
- 6. Understand how linker and loader create an executable program from an object module created by assembler and compiler.

UNIT-I

Introduction – System Software and Machine Architecture – Simplified Instructional Computer (SIC) – CISC Machines – RISC Machines – Assemblers: Basic Assembler Functions – Machine Dependent Assembler Features - Machine Independent Assembler Features – Assembler Design Options – Implementation Examples: MASM Assembler.

UNIT-II

Loaders and Linkers: Basic Loader Functions - Machine Dependent Loader Features - Machine Independent Loader Features –Loader Design Options – Implementation Examples: MSDOS Linker.

UNIT-III

Compilers: Basic Compiler Functions - Machine Dependent Compiler Features - Machine Independent Compiler Features – Compiler Design Options – Implementation Examples: Sun OS C Compiler – Java Compiler and Environment.

UNIT-IV

Macro Processors: Basic Macroprocessor Functions - Machine Independent Macroprocessor Features – Macroprocessor Design Options – Implementation Examples: ANSI C Macro language.

UNIT-V

Operating System: Basic Operating System Functions - Machine Independent Operating System Features – Operating System Design Options – Implementation Examples: MSDOS - Sun OS.

Other System Software: Database Management Systems – Text Editors.

TEXT BOOK

System Software-An Introduction to Systems Programming, Leland. L. Beck, 3rd Edition, 2010, Pearson Education.

(Page Numbers: Unit-I -1, 3-4, 4-20, 21-28, 29-40, 44-52, 52-65, 66-92, 92-102, 103-105. Unit-II - 123-124, 124-129, 129-147, 147-151, 151-159, 160-162. Unit-III - 225-271, 272-278, 278-299, 299-305, 305-308, 313-315.Unit-IV - 175-186, 186-197, 197-206, 209-213.Unit-V- 325-331, 372 - 387, 387 - 399, 400-403, 406-409)

REFERENCES

- 1) John R. Levine, Linkers & Loaders Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2000.
- 2) The Art of assembly language, Randall Hyde, 2nd Edition, 2010, No Starch Press.
- 3) Santanu Chattopadhyay, "System Software", Prentice-Hall India, 2007.
- 4) Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques, and Tools", 2nd Edition, Pearson Education Asia, 2006.

15CSU304C

ARTIFICAL INTELLIGENCE

Course Objectives

- To gain a historical perspective of AI and its foundations.
- To become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- To investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- To experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
- To experiment with a machine learning model for simulation and analysis.
- To explore the current scope, potential, limitations, and implications of intelligent systems.

Course Outcomes (COs)

- 1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- 2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- 3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems.
- 4. Understand the a basic concept of logical inference and use inference in propositional or predicate logic
- 5. Understand the concept of how expert systems work
- 6. Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

UNIT-I

Introduction: AI Problems-AI Techniques-Criteria for success-Problems, Problem spaces and search: Defining the problem as State space search-Production Systems-Problem characteristics-Issues in design of search.

UNIT-II

Heuristic Search Techniques: Generate and test-Hill Climbing-Best-First search-Problem Reduction-Constraint Satisfaction-Mean end analysis

UNIT-III

Knowledge Representation Issues: Representations and Mappings-Approaches to Knowledge representation-Issues to knowledge representation-Frame problem.

UNIT-IV

Using Predicate logic: Representing simple facts in logic-Representing Instance and ISA relationships-Computable functions and predicates-Resolution-Natural Deduction.

UNIT-V

Representing Knowledge using Rules: Procedural versus Declarative Knowledge-Logic Programming-Forward versus Backward Reasoning-Matching-Control Knowledge-Expert Systems.

TEXT BOOK

Elaine Rich, Kavin Knightt and Shiva Shankar B. Nair 2009. Aritificial Intelligence, 3rd Edition, Tata McGraw Hill Publishing Company Limited, New Delhi. (**Page Nos.:** 4-20, 25-47; 50-74; 79-96; 99-125; 128-142, 422-429)

REFERENCES

Stuart Russell and Peter Norvig. 2008. Artificial Intelligence-A Modern Approach, 2nd Edition, Pearson Education, New Delhi.

WEB SITES

- 1. www.en.wikipedia.org/wiki/Artificial_intelligence
- 2. www.cin.ufpe.br/.../artificial-intelligence-modern-approach.
- 3. www.amazon.in/Artificial-Intelligence-Elaine-Rich/dp/0070522634

- Students will be able to apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.
- To achieve the analytical and reasoning competencies and to improve their communication and presentation skills
- To impact knowledge on both Aptitude and Soft skills to the students
- To actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- To critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
- To reinforce competencies in soft skills which are crucial in a social setting

Course Outcomes(COs)

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

- 1. Understand the basic concepts of QUANTITATIVE ABILITY
- 2. Understand the basic concepts of LOGICAL REASONING Skills
- 3. Acquire satisfactory competency in use of VERBAL REASONING
- 4. Actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- 5. Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- 6. Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

UNIT - I

Time, Speed and Distance, Time and Work, Pipes and Cisterns, Geometry, Data Arrangement

UNIT – II

Analogy, Logic based Venn diagram, Probability, Permutation and Combination, Logarithms

UNIT – III

Data Sufficiency, Clocks, Calendar, Reading Comprehension, Sentence Correction, Sentence Completion, Spotting the Errors, Jumbled Sentences

UNIT – IV

Synonyms, Antonyms, Verbal Analogy, Statements and Assumptions, Group Discussion

UNIT - V

Resume Writing, Introduction to HR rounds, Time Management, Attitude and Behaviour

(For undergraduates students admitted from 2015 onwards)

Course Objectives:

- To train the students in understanding the concepts of communication.
- To be familiar with the four basic skills of English.
- To train students in developing their written communication.
- To train students in developing their presentation skills.
- To acquire the skill of making grammatically correct sentences.
- To reflect originality on the application of soft skill views and express in writing their views.

Course Outcome:

- 1. Students have acquired proficiency in communication.
- 2. Students have become adept in written communication and presentation skills.
- 3. Developed the skill of writing in English and that of public speaking.
- 4. Establish and maintain social relationships.
- 5. Develop communication skills in business environment.
- 6. Enhanced communication competency through LSRW skills

UNIT I – Concept of Communication – Barrier to Communication –Body language – Personality Development – Etiquette and Manners- Soft Skills – Emotional Intelligence

UNIT II – Listening Comprehension – Reading Comprehension – Paragraph writing – Precis Writing – Writing Resume and Covering Letter -Speaking – Welcome Address, Vote of Thanks, Compering, Debates, Role Play, Dialogues – Vocal Communication Techniques. Voice, Quality, Volume, Pitch

UNIT III – Dicto Composition – Letter Writing (Informal, Letters to the Editor etc) – Term paper – Book reviews

UNIT IV – Business Correspondence – Layout of Business Letter – Formal Styles of Business Letters – Letters of Acceptance, Appointment, Resignation, Complaint, Sending E-mails.

UNIT V – Effective Presentation – Planning – Audience Analysis –Logical Sequencing – Timing of the Presentation – Conclusion – Answering Queries – Group Discussion – Interview.

Prescribed Text:

1. Juneja. P. Om and Aarati Mujumdar, "Business Communication -Techniques and Methods", Orient Blackswan Pvt. Ltd., Hyderabad: 2010.

Reference:

- 1. Badi, R.V and K. Aruna. Business Communication, 2008, Vrinda Publications: New Delhi.
- 2. Balasubramanian M and G Anbalagan. Performance in English. 2007.Anuradha Publications: Kumbakonam
- 3. Mohan, Krishna and Meenakshi Raman.2008, Effective English Communication, Tata McGraw Hill: New Delhi.
- 4. Selley, John. Oxford Guide to Effective Writing and Speaking. 2005. OUP: New Delhi.

15CSU401 RELATIONAL DATABASE MANAGEMENT SYSTEM 5 1 0 6

Course Objectives

- To describe a good introduction to the discipline of database management systems.
- To give a good formal foundation on the data models and E-R model.
- To demonstrate the principles database constraints behind systematic database design by covering normalization concept.
- To introduce the concepts of basic SQL as a universal Database language.
- To have an introductory knowledge about the PL/SQL concept
- To normalize the existing database to various levels

Course Outcomes (COs)

Upon completion of this course, students will be able to:

- 1. Demonstrate an understanding of the elementary features of RDBMS
- 2. Design conceptual models of a database using ER modeling for real life applications
- 3. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database
- 4. Able to develop structured query language (SQL) queries to create, read, update, and delete relational database
- 5. Design efficient PL/SQL programs to access Oracle databases
- 6. Demonstrate the principles database constraints behind systematic database design by covering normalization concept.

UNIT-I

Understanding Database Fundamentals: What is data, information, database, RDBMS. – Database environments – origin of database – database elements – design concepts – what makes a good database?- Database Models : flat file – hierarchical model – network model – relational model – object oriented model – object relational model. Relational database: characteristics – concepts – language (SQL).

UNIT-II

Entities and Entity Relationships: entities – relationships: one to one, one to many, many to many, recursive, mandatory, and optional – transformation of the entity in design – accessing the data – avoiding poor relationship constructs. ER Diagram: how ERD is used – typical ERD symbols – cardinalities – sample ERD.

Functional Dependencies: Introduction – definition – keys – inference axioms – redundant functional dependencies – membership algorithm. Closures, cover and equivalence of functional dependencies: closure of a set F - closure of a set of attributes – closure algorithm – Non Redundant cover algorithm.

UNIT-III

Objects : table – view – index – sequence – synonyms. Data types. Constraints – primary key, unique, not null, default, check, referential integrity constraints – table level – column level – naming constraints. E.F. Codd's rules.

Data Definition Language: create objects, CTAS – alter objects, add and drop columns and constraints; changing field size – drop objects – truncate table.

Data Manipulation Language : Insert, insert ... as – update – delete – select with where, group by, order by, having clauses- Simple sub queries –

Operators: arithmetic – relational – boolean – exists, like, in, all, not - assignment – concatenation . Set operators: intersect – minus – union – union all-Aggregate functions.

Data Control language: grant, revoke – simple privileges. Simple flashback queries: drop table

UNIT-IV

Overview of PL/SQL – declaration section – executable command section: conditional logic, loops, CASE statements – exception handling section: predefined and user defined exceptions.

Triggers: definition – types : row level, statement level, before and after, instead of – syntax – enabling and disabling triggers - replacing and dropping triggers.

Cursors – definition – open – fetch – close – cursor attributes- select for update – types : implicit, explicit.

Procedures, Local and global – procedures vs functions – stored procedures- syntax - calling procedures - replacing and dropping procedures.

Functions: stored functions - syntax - calling functions - replacing and dropping functions.

UNIT-V

Packages: Package header-package body- calling packages-replacing and dropping packages.

Overview of Normalization: advantages - disadvantages. Normal forms: first normal form – second normal form – third normal form – boyce- codd normal form – Introduction to fourth, fifth and sixth normal forms – denormalization.

TEXT BOOKS

- 1. Bipin C. Desai. 2008. An Introduction to Database Systems, Galgotia Publications, New Delhi.
- Kevin Loney and George Koch. 2002. Oracle 9i The Complete Reference, 1st Edition, Tata Mcgraw-Hill, New Delhi.

(Page Nos.: 117,232-236,325-340,355-362,480-484, 490-506,511,527-528,532-547)

- Ramon A. Mata-Toledo and Pauline K. Cushman. 2001. Schaum's Outline of Fundamentals of Relational Databases, 1st Edition, Tata McGraw-Hill, New Delhi. (Page Nos.: 122-136)
- Ryan K. Stephens and Ronald R. Plew. 2000. Database Design, 1st Edition, Sams Publishing, New Delhi. (Page Nos.: 11-52, 162-174, 186-197)

REFERENCES

- 1. Gerald V. Post. 2005. Database Management Systems Designing and Building Business Applications, 2nd Edition, Tata McGraw-Hill, New Delhi.
- 2. Raghu Ramakrishnan and JohannesGehrke. 2003. Database Management Systems, 3rd Edition, McGraw-Hill, New Delhi.
- 3. Rajesh Narang. 2006. Database Management Systems, 1st Edition, Prentice Hall of India, New Delhi.

WEB SITES

- 1. http://en.wikipedia.org/wiki/RDBMS
- 2. http://aspalliance.com/1211_Relational_Database_Management_Systems__Concepts __and_Terminologies
- 3. www.compinfo-center.com/apps/rdbms.html

- To Study the basic concepts and functions of operating systems.
- To understand the structure and functions of OS.
- To Learn about Processes, Threads and Scheduling algorithms.
- To Understand the principles of concurrency, Deadlocks and Memory Management
- To Learn about the Protection and Security Concepts.
- To provide experience on MS Windows and LINUX environment.

Course Outcomes (COs)

Upon completion of this course the students will be able to:

- 1. Design various Scheduling algorithms.
- 2. Apply the principles of concurrency.
- 3. Design deadlock, prevention and avoidance algorithms.
- 4. Compare and contrast various memory management schemes.
- 5. Apply the Security Concepts based on Authentication.
- 6. Work in MS Windows and LINUX environment.

UNIT-I

Introduction - What is an OS? – Mainframe systems Desktop Systems – Multiprocessor systems – distributed systems – real time systems. Process: - Process concepts – Operation on process – cooperation process - Inter process Communication -Mutual Exclusion - Critical sections- primitives – Semaphores

UNIT-II

Storage management: Memory Management –Background-swapping- Contiguous memory allocation – paging, segmentation – segmentation with paging – Virtual memory :Background- Demand Paging, Process Creation – Page replacement – Thrashing.

UNIT-III

CPU Scheduling : Basic concepts : - Scheduling Criteria – Scheduling Algorithms – FCFS- SJF- Priority – RoundRobin – Multilevel Queue – Multilevel Feedback Queue -. Deadlock: Introduction, Examples of deadlock, Deadlock prevention, avoidance, detection, recovery from deadlock.

UNIT-IV

File systems: File System Concepts – Access Methods – Directory structure – File Sharing – Allocation Methods – Free space management –Efficiency and performance – Recovery-Disk Performance Optimization: Introduction – Disk structure – Disk scheduling – Disk management.

UNIT-V

Case Studies: Linux \rightarrow Introduction-History-Design Principles-File System-Memory Management-Windows7 \rightarrow History, Design Principles, File System and Networking-Android \rightarrow Why develop for Android, Android Development Basics.

TEXT BOOK

1. Operating System concepts, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 9th edition, 2013, JohnWiley&Sons,Inc.

REFERENCES

- 1. Deitel H.M. 2005. Operating systems, 3rd Edition, Addision Wesley Publication, New Delhi.
- 2. Pramod Chandra P. Bhatt. 2007. An Introduction to Operating Systems, 2nd Edition, Prentice Hall India, New Delhi.
- 3. Tanenbaum Woodhull. 2014. Operating Systems 4th Edition, Prentice Hall.
- 4. William Stallings. 2009. Operating Systems internals and Design Principles, 6th Edition, Prentice Hall of India, New Delhi.
- 5. Android Application development for dummies, Michael Burton, Donn Felker, 2nd Edition, Wiley.

WEB SITES

- 1. www.cs.columbia.edu/~nieh/teaching/e6118_s00/
- 2. www.clarkson.edu/~jnm/cs644
- 3. pages.cs.wisc.edu/~remzi/Classes/736/Fall2002/

15CSU411

RDBMS (ORACLE) LAB

Course Objectives

- To describe a good introduction to the discipline of database management systems.
- To give a good formal foundation on the data models and E-R model.
- To demonstrate the principles database constraints behind systematic database design by covering normalization concept.
- To introduce the concepts of basic SQL as a universal Database language.
- To have an introductory knowledge about the PL/SQL concept
- To normalize the existing database to various levels

Course Outcomes (COs)

Upon completion of this course, students will be able to:

- 1. Demonstrate an understanding of the elementary features of RDBMS
- 2. Design conceptual models of a database using ER modeling for real life applications
- 3. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database
- 4. Able to develop structured query language (SQL) queries to create, read, update, and delete relational database
- 5. Design efficient PL/SQL programs to access Oracle databases
- 6. Demonstrate the principles database constraints behind systematic database design by covering normalization concept.

List of programs

- Field Data type **Sample Values** Varchar2 Karpagam, Ananya Cust_name Char F or M gender DOB Date Varchar2 type Credit or Cash address Varchar2 citv Varchar2 last purchased Date
- 1. Create a table, "Customer" with the following fields:

- a) Insert records into the table.
- b) List all male customers.
- c) List all female customers who live in Coimbatore.
- d) List all customers who bought things today for credit.
- 2. Create a parent table, "Suppliers" with the following fields:

Field	Data type	Constraints	Sample Values
Sup_code	Varchar2	Primary Key	A001, S001, A002
Name	Varchar2	Not null	Ananya, Shakthi, Ananth
gender	Char	Check (F/M)	F, M
type	Varchar2	Check (Credit / Cash)	Credit, Cash

address	Varchar2		
city	Varchar2		
Mobile	Number	unique	

Child table : Supply_items

Field	Data type	Constraints	Sample Values
Sup_code	Varchar2	Reference Key	
Item_Name	Varchar2	Not null	
Price	Number	Check (>=5 and <=250)	
Deliver_within	Number		1, 2, 3,

- a) Insert records into both the table.
- b) List the suppliers name and city, who supply "Ice creams"
- c) List the total number of different items along with the suppliers name.
- d) List the suppliers name, who supply Biscuits within one day.
- e) List all the female suppliers who supply for credit but do not supply Pepsi.
- 3. Create the tables, Item (item_code, name, sell_price, qty_at_hand) and sales(item_code, s_date, qty_sold) with the required constraints.
 - a) Change the name of the item from "System" to "Computer System".
 - b) Delete all the sales records if the item name is "Mouse".
 - c) Insert a new attribute "Tax" to Sales table.
 - d) Fill the Tax field with the following value: 4% of selling price * sold quantity.
 - e) Delete the records from both the table, if the item have not been sold for the past 20 days.
- 4. Create a table, "Vehicle" with the following fields:

Field	Sample Values
V_code	B001, S001, C002, Auto,
V_Name	Bike, Scooter, Car, Auto
Туре	Only 2, 3, or 4. (Wheelers)
Company	
On_road_price	
Colour	Only Red, black, yellow or silver
Date_purchased	
Model	

- a) Insert the records. For V_code use sequence.
- b) Create a view on vehicle table, but only for silver colour four wheelers.
- c) Delete the vehicles whichever purchased before one year from the view.
- d) Select the records from the view, which have the on road rate between 3 and 7.5 lakhs.
- e) Drop the view
- f) Select all the silver colour cars. (observe the difference between view and a table

5. Write a recursive program to find the factorial and Fibonacci for the given number using PL/SQL.

6. Create the following tables:

- (i) "Library_Books" with the following fields: Book_Acc_No (primary key), ISBN, Title, Author, Publication, Year_Pub (<=2008), Edition, Copies (minimum 1), Specification (CSC, Phy, Che, Eng, Fus, Bus,...)
- (ii) "Student" with the following fields: (primary key), Name, Gender(F / M), Course, (CSC, Phy, Che, Eng, Fus, Bus,...), Year(I, II, III)
- (iii)"Lend_Books" with the follwing fields: Book_Acc_No (Foreign key), Reg_no(Foreign key), Date_issued, Date_return. (Note: Book_Acc_No and Reg_no, both together provide uniqueness)
 - a) Insert records in all the tables created.
 - b) Write a trigger, to reduce the number of copies in the Library_Books table, whenever a book is lent to a student.
 - c) List the books information, which is issued before Jan 1st, 2008, along with the student information who borrowed them.

7. Create a student detail database with roll number, name, date of birth, course, department, semester, percentage.

Field	Data type	Sample Values
RNo	Number	3
SName	Varchar2	15
DOB	Date	
Course	Varchar2	6
Dept	Varchar2	4
Semester	Varchar2	3
Percentage	Number	5,2

Insert 5 records into the database and perform the following operations.

- 1. Select all Records.
- 2. Select rollno, name, percentage from student.
- 3. Select distinct course and dept.
- 4. Select details of all students with percentage greater than 75.
- 5. Select roll number and name of all records sorted in order by percentage.
- 6. Select name of students belonging to 3rd semester MBA degree.
- 7. Select name, course and semester of all students not in MBA department.
- 8. Select all records where name is start with alphabet "A".

8. Create a table "Mobile", with the following fields: code (alphanumeric field), mobile_name, model, company, amount, warranty

- a) Generate the code automatically through a stored function. Code is an alphanumeric field. (Sample values : NOK001, SON001, SAM001, NOK002,...)
 - a. List all mobiles details, whose company name start with "S".

- b. Create another tale "Nokia" from the Mobile table using CTAS concept, which includes only Nokia mobiles.
- c. Insert more records into Nokia table.
- d. Select all the records from both the tale individually, to observe the link between these two tables.
- e. Select all the records from the Nokia table, which are not in Mobile table.
- f. Display the information about the second highest price Sony mobile.
- g. List the number of mobiles and the average price of each mobile company.
- h. List the mobiles information in company's alphabetical order.
- i. List the mobile names and models, which have the palindrome model numbers.
- 9. Demonstrate a program for exceptional handling (using an employee database).

10. Consider the following database for a banking enterprise.

BRANCH(**branch_name**:string , branch_city:string , assets:real)

ACCOUNT(**accno**:int , branch_name:string , balance:real)

DEPOSITOR(customer_name:string , accno:int)

CUSTOMER(**customer_name**:string , customer_street:string , customer_city:string) LOAN(**loan_number**:int , branch_name:string , amount:real)

BORROWER(customer_name:string , loan_number:int)

1)Create the above tables by properly specifying the primary keys and foreign keys.

2)Enter at least five tuples for each relation.

3)Find *all* the customers who have at least two accounts at the *main* branch.

4)Find all the customers who have an account at *all* the branches located in a specific city.

5)Demonstrate how you delete all account tuples at every branch located in a specific city.

11. Create table Department and Student with relevant fields and constraints. ad enter the records. Create one more table : "Result".

• Write a stored procedure using cursor, to get the input for Result table and enter into it.

12. Create the following tables:

- i) Parent table : "Department" with the following fields: Dept_code (primary key), Dept_name, Head
- ii) "Employee": Fields emp_code, dcode(foreign key), emp_name, basic_pay, experience, net_pay. [Note: primary key emp_code, dcode, net_pay default value is 0]
- iii) "Salary" (child table of Employee) : Fields emp_id, dcode, Da, hra, cca, ia, ma, pf.
- iv) "Loan" (child table of Employee) : Fields emp_id, dcode, house, vehicle, medical.
 - 1. Insert records into Department and Employee tables.
 - 2. Update net pay by calling a stored function.

- 3. Create a stored procedure to get the input for Loan table table and enter the data as record into it.
- 4. Create a stored function, to calculate the DA, HRA, CCA, IA, MA and the Net pay of the employees. Enter the data as records into Salary tale and update the net pay field in the Employee table.
- 5. Create a package including the above created procedure and function.

	Calculation:
DA	103 % of Basic Pay
HRA	25 % of Basic Pay
CCA	1 % of Basic Pay
IA	1.1 % of Basic Pay
MA	8 % of Basic Pay
PF	12 % of Basic Pay
Net Pay	BP + DA + HRA + CCA + IA + MA - PF - Loan
	if any.

13. Normalize a student table (include the necessary filed) from 1NF to 4NF.

Some sample PL/SQL Programs

- 14. Write a recursive program for finding the factorial of a given number.
- 15. Write a recursive program for finding the first n Fibonacci number.
- 16. Write a PL/SQL program for multiplication tables 3, 4, 5 and 6.
- 17. Write a recursive program for finding the reverse of a given number.
- 18. Write SQL queries to illustrate the string functions a mathematical functions.
- 19. Write a program for finding the reverse of a given string.

- To recognize the error in the number generated by the solution.
- To compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method.
- To apply method of interpolation and extrapolation for prediction.
- To recognize elements and variable in statistics and summarize qualitative and quantitative data.
- To calculate mean, median and mode for individual series.
- To outline properties of correlation and compute Karl-Pearson's coefficient of correlation.

Course Outcomes (COs)

Upon completion of the course students shall be able to:

- 1. Recognize the error in the number generated by the solution.
- 2. Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method.
- 3. Apply method of interpolation and extrapolation for prediction.
- 4. Recognize elements and variable in statistics and summarize qualitative and quantitative data.
- 5. Calculate mean, median and mode for individual series.
- 6. Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.

UNIT-I

Meaning and definition of statistics – Classification of data - Frequency distribution -Diagrammatic Presentation – Bar diagram and Pie diagram – Graphic Presentation – Histogram, Frequency Polygon, Frequency curve and Ogives.

UNIT – II

Measures of central tendency – Arithmetic mean, median and mode. Measures of dispersion-Range, standard deviation, Coefficient of variation.

UNIT – III

Correlation – Meaning and definition - Scatter diagram –Karl pearson's correlation coefficient. Rank correlation.

Regression: Regression in two variables – Regression coefficient problems – uses of regression.

UNIT – IV

Probability theory : Axioms of Probability–Addition theorem – Multiplication theorem – conditional Probability.

Theoretical Distribution: Basic Concepts - Binomial distribution, Poisson Distribution & Normal distribution (No derivations) and simple problems.

UNIT – V

Test of significance: Tests based on Means only-Both Large sample and Small sample tests - Chi square test - goodness of fit.

TEXT BOOK

1. R.S.N.Pillai, Bagavathy. "Statistics", S. Chand & Company Ltd. New Delhi, 2002.

REFERENCES:

- 1. Jerrold H.Zar, 2003, Bio-Statistical Analysis, Fourth Edition, Pearson Education, (Pte).Ltd, New Delhi.
- 2. PA.Navnitham. 2006. Business Mathematics and Statistics, Jai Publishers, Trichy 21,
- 3. S.P. Gupta . "Statistical methods". Sultan Chand & Sons, New Delhi, 2001.

4

4 2 0

OPERATIONS RESEARCH

Course Objectives

This course enables the students to

- To learn the basic concepts and applications of linear programming.
- To impart knowledge in concepts and tools of Operations Research.
- To know the constructive techniques to make effective business decisions
- Define and formulate linear programming problems and appreciate their limitations
- To Identify and develop operational research models from the verbal description of the real system
- To Solve network models like the shortest path, minimum spanning tree, and maximum flow problems

Course Outcomes (COs)

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

- 1. Understand the basic concepts and application of operation research in various fields.
- 2. Understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively
- 3. Define and formulate linear programming problems and appreciate their limitations
- 4. Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry
- 5. Identify and develop operational research models from the verbal description of the real system
- 6. Solve network models like the shortest path, minimum spanning tree, and maximum flow problems

UNIT I

Linear Programming: Formulation of LPP – Graphical solution to LPP –Simplex method – Big M method and Duality in LPP.

UNIT II

Transportation model: Introduction – Mathematical Formulation –Finding initial Basic Feasible solutions – Optimum solution for non degeneracy and degeneracy model -Unbalanced Transportation problems and Maximization case in Transportation problem

UNIT III

The Assignment problem - Mathematical formulation of the problem – Hungarian method –Unbalanced Assignment problem- Maximization case in Assignment problem.

Queuing theory : Introduction – Characteristics of queuing system. Problems in $(M/M/1):(\infty/FIFO)$ and (M/M/1):(N/FIFO) models .

UNIT IV

Inventory Control: Introduction – Costs involved in inventory – Deterministic EOQ models – Purchasing Model without and with shortage, Manufacturing Model without and with shortage -Price break.

UNIT V

PERT and CPM: Network representation – Calculation of Earliest expected time, latest allowable occurrence time.CPM - various floats for activities – critical path. PERT –Time estimates in PERT- Probability of meeting scheduled date of completion of projects .

TEXT BOOK

Kanthi Swarup, Gupta P.K., Man Mohan., 2006. Operations Research, Sultan Chand & Sons, New Delhi. (For Unit I – V)

REFERENCES

- 1. Sharma J.K., 2009.Operations Research: Theory and Applications, Macmillan publishers India Ltd, New Delhi.
- 2. Sundaresan V., Ganapathy Subramanian K.S., and Ganesan K., 2005(III edition), Resource Management Techniques, A. R. Publications, Nagapatinam.

3. Shanthi Sophia Bharathi D.,1999(II edition),Operations Research/Resource management techniques, Charulatha Publications.
Semester-IV L T P C

4

4 2 0

15CSU403C

DISCRETE MATHEMATICS

Course Objectives

This course enables the students to

- To learn the basic concepts of sets, types of sets, functions and relations
- To understand about Pigeonhole principle, Permutation and Combination, Mathematical Induction
- To solve the problems using Recurrence relations and generating functions.
- To know the basic concepts of Logical Connectives, Graphs and Trees.
- To express ideas using mathematical notation
- To solve problems with the help of tools of mathematical analysis.

Course Outcomes

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

- 1. Familiar with elementary algebraic set theory.
- 2. Acquire a fundamental understanding of the core concepts in growth of functions.
- 3. Describe the method of recurrence relations.
- 4. Get wide knowledge about graphs and trees
- 5. Initiate to knowledge from inference theory
- 6. Solve problems with the help of tools of mathematical analysis.

UNIT-I

Mathematical logic: Connections well formed formulas, Tautology, Equivalence of formulas, Tautological implications, Duality law, Normal forms, Predicates, Variables, Quantifiers, Free and bound Variables.

UNIT-II

Relations: Properties of Binary relations – Equivalence relations - composition of relations, Closure of relations – Order relations – Partial order relations.

Functions: one-to-one, onto, one-to-one-onto functions – composition of functions, Inverse functions.

UNIT-III

Formal languages and Automata: Grammars: Phrase–structure grammar, contextsensitive grammar, context-free grammar, regular grammar. Finite state automata-Deterministic finite automata and Non deterministic finite automata-conversion of non deterministic finite automata to deterministic finite automata.

UNIT-IV

Lattices and Boolean algebra: Partial ordering, Poset, Lattices, Boolean algebra, Boolean functions, Theorems, Minimization of Boolean functions.

UNIT-V

Graph Theory: Directed and undirected graphs, Paths, Reachability, Connectedness, Matric representation, Eular paths, Hamiltonean paths, Trees, Binary trees simple theorems, and applications.

TEXT BOOK

1. Tremblay J.P., and R.P Manohar., 1975 . Discrete Mathematical Structures with applications to computer science, Tata Mc.Graw Hill, New Delhi. (For Unit I - V)

REFERENCES

- 1. Sundaresan V., Ganapathy Subramanian K.S., and Ganesan K., 2002. Discrete Mathematics, A.R. Publications, Nagapatinam.
- 2. Veerarajan T.,2007, Discrete mathematics with graph theory and combinatorics, Tata Mc-graw hill companies, New Delhi.
- 3. Sharma.J.K, 2005, Discrete Mathematics, Second Edition, Macmillan India Ltd.

- Students will be able to apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.
- To achieve the analytical and reasoning competencies and to improve their communication and presentation skills
- To impact knowledge on both Aptitude and Soft skills to the students
- To actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- To critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
- To reinforce competencies in soft skills which are crucial in a social setting

Course Outcomes(COs)

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

- 1. Understand the basic concepts of QUANTITATIVE ABILITY
- 2. Understand the basic concepts of LOGICAL REASONING Skills
- 3. Acquire satisfactory competency in use of VERBAL REASONING
- 4. Actively do mathematics—such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections.
- 5. Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
- 6. Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC, GPSC etc.

UNIT - I

Time, Speed and Distance, Time and Work, Pipes and Cisterns, Geometry, Data Arrangement

UNIT – II

Analogy, Logic based Venn diagram, Probability, Permutation and Combination, Logarithms

UNIT – III

Data Sufficiency, Clocks, Calendar, Reading Comprehension, Sentence Correction, Sentence Completion, Spotting the Errors, Jumbled Sentences

UNIT – IV

Synonyms, Antonyms, Verbal Analogy, Statements and Assumptions, Group Discussion

UNIT - V

Resume Writing, Introduction to HR rounds, Time Management, Attitude and Behaviour

		Semester-v
		LTPC
15CSU501	VISUAL PROGRAMMING	4 1 0 5

Course Objectives

- To understand the visual platform and apply the power of .Net technologies in programming
- To Create windows forms using arrays and flow control statements.
- To Learn to use Basic windows controls using Visual Basic.Net
- To Learn to use the classes and namespaces in the .NET Framework class library.
- To Develop Web Applications using Microsoft ASP.NET programming.
- To Understand the concept of Multiple Document Interface and the architecture of .NET

Course Outcomes (COs)

Upon completion of this course the students will be able to:

- 1. Develop Windows based applications using Visual Basic.Net
- 2. Learn various tools in .net applications
- 3. Differentiate between the types of applications supported by .Net
- 4. Implement ADO.Net concept in VB.Net and ASP.Net applications
- 5. Create server side web applications using ASP.NET
- 6. Understand the concept of data sources and data bound controls in VB.NET and ASP.NET

UNIT-I

Getting Started With VB.NET: The Integrated Development Environment-IDE Components-Visual Basic: The Language -Variables-Constants-Arrays – Variables as Objects-Flow Control Statements- Writing and Using Procedures: Module Coding – Arguments-Working with Forms: Appearance of Forms- Loading and Showing Forms.

UNIT-II

Basic Windows Controls: Textbox Control- ListBox, CheckedListBox-Scrollbar and TrackBar Controls. More Windows Control: The common Dialog Controls-The Rich TextBox Control.The TreeView and ListView Controls -Designing Menus. Multiple Document Interface

UNIT-III

Handling Strings, characters and Dates: Handling Strings and Characters – Handling Dates. Working with Folders and Files: Accessing Folders and Files – Accessing Files. Drawing and Painting with Visual Basic: Displaying Images – Drawing with GDI – Co-ordinate Transformation – Bitmaps.

UNIT-IV

Web forms and ASP.NET: Web forms, web controls-ASP.NET Configuration, Scope and state- ASP.NET and state-The Application Object-ASP sessions-The Session object-ASP.NET objects and components-Active server components and controls.

UNIT-V

Web server and ASP.NET-ASP.NET and SQL server-Using SQL server, using database in ASP.NET applications, ActiveX data objects-The ADO.NET objects model.

TEXT BOOK

- 1. Jeffrey R. Shapiro. 2008. The Complete Reference Visual Basic.Net, 1st Edition, Tata -McGraw-Hill Edition, New Delhi.
- 2. Evangelos Petroutsos. 2002. Mastering Vb. Net, SYBEX Inc., USA.
- 3. Dave Mercer. ASP.NET Beginner's Guide. 2nd Edition, New Delhi: MCGraw Hill, 2003.

REFERENCES

- 1. Richard Bowman. 2002. Visual Basic.Net, Hungry Minds Inc. Publication, Canada
- 2. Bill Evjen, Scott Hanselman, Farhan Mohammed, Srinivasa Siva Kumar and Devin Rader. 2006. Asp.Net 2.0, Wiley Publication, USA.
- 3. Greg BucZek. Asp.Net Tips and Techniques, 1st Edition, New Delhi: Tata McGraw Hill Publications 2005.

- 1. http://visualbasic.w3computing.com/vb2008/
- 2. http://www.tutorialspoint.com/vb.net/vb.net_environment_setup.htm
- 3. http://www.msdotnet.co.in
- 4. http://www.w3schools.com/

- To master the fundamentals of data communications networks by gaining a working knowledge of data transmission concepts.
- To study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
- To read the fundamentals and basics concepts of Physical layer with real time examples
- To study data link layer concepts, design issues, and protocols.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport layer and Application layer.

Course Outcomes (COs)

Upon completion of this course the students will be able to:

- 1. Understand the functions of each layer in OSI and TCP/IP model.
- 2. Explain the multiplexing, switching concept and types of transmission media with real time examples.
- 3. Understand the error detection and correction methods and can implement the data link layer protocols
- 4. Understand channel error detection and correction, MAC protocols, Ethernet and WLAN.
- 5. Learn different medium access method to avoid collision and to learn about routing table.
- 6. Learn basic functionalities of transport layer and application layer.

UNIT-I

Data Communication: An Overview – Protocols and Standards. Network Models: The OSI Model and Layers – TCP/IP Protocol Suite – Addressing. Physical Layer: Analog and Digital Signals – Transmission Impairments.

UNIT-II

Physical Layer: Multiplexing – Frequency Division Multiplexing-Wavelength Division Multiplexing– Synchronous Time-Division Multiplexing– Statistical Time Division Multiplexing. Transmission Media - Guided Media- Twisted pair and coaxial cable -Fiber optic cable-Unguided Transmission Media Switching – Circuit Switched Networks-Datagram Networks – Virtual Circuit networks.

UNIT-III

Data Link Layer: Error Correction and Detection – Framing – Flow and Error Control – Protocols – Noisy and Noiseless Channel – Multiple Access.

UNIT-IV

Network Layer: IPv4 addresses – Internetworking – IPv4 – Delivery and Forwarding – Unicast Routing Protocols.

Transport Layer: Process to Process Delivery – User Datagram Protocol – Transmission Control Protocol.

UNIT-V

Transport Layer: Data Traffic – Congestion Control.

Application Layer: Electronic Mail – File Traffic –WWW and HTTP – Symmetric Key and Asymmetric Key Cryptography – Security Services – Message Integrity – Message Authentication – Digital Signature.

TEXT BOOK

 Behrouz A. Forouzan. 2006. Data Communication and Networking, 4th Edition, McGraw Hill, New Delhi. (Page Nos. : 3-6, 19-21, 27-50, 57-94, 161-185, 191-207, 213-227, 267-300, 307-339, 363-390, 549-565, 579-595, 647-677, 703-735, 824-844, 851-868, 935-955, 961-962, 964-976, 981-989)

REFERENCES

- 1. Andrews S. Tanenbaum. 2003. Computer Networks. 4th Edition, Prentice Hall of India, New Delhi.
- 2. Douglas E. Comer. 2000. Computer Networks and Internets, 2nd Edition. Pearson Education Asia, New Delhi.
- 3. Stanford H. Rowe and Marsha L. Schuh. 2005. Computer Networking, 1st Edition, Pearson Education,
- 4. William Stallings. 2007. Data and Communication Network, 8th Edition, Tata McGraw Hill, New Delhi.

- 1. www.mhhe.com/engcs/compsci/forouzan/
- 2. www.amazon.com/Data-Communications-Networking-Behrouz-Forouzan/dp/0072923547
- 3. highered.mcgraw-hill.com/sites/0072515848/information_center_view0/ -

- To learn the basic principles of 3- dimensional computer graphics
- To Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition
- To Provide an understanding of mapping from a world coordinates to device coordinates and projections.
- To extract scene with different clipping methods and its transformation to graphics display device.
- To explore projections and visible surface detection techniques for display of 3D scene on 2D screen

Course Outcomes(COs)

- 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
- 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
- 3. Use of geometric transformations on graphics objects and their application in composite form.
- 4. Extract scene with different clipping methods and its transformation to graphics display device.
- 5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.
- 6. Render projected objects to naturalize the scene in 2D view and use of illumination models for this..

UNIT-I

A Survey of Computer Graphics- Video Display Devices- Refresh cathode-Ray Tubes-Raster Scan Displays-Random Scan Displays-Color CRT Monitors-Direct –View Storage Tubes-Flat Panel Displays-Raster Scan Systems-Three Dimensional Viewing Devices-Random Scan Systems.

UNIT-II

Input Devices: Keyboards-Mouse –Joysticks- digitizers-Image Scanners- Touch Panels-Light Pens-Voice Systems-Wireless I/O devices -Hard Copy Devices: Printers and Plotters

UNIT-III

Point and Lines- Line Drawing Algorithms: DDA Algorithm- Bresenhams Line Algorithm. **Circle Generating Algorithms**: Mid Point Circle Algorithm. Two Dimensional Geometric Transformations: **Basic Transformations**: Translation-Rotation-

Scaling-**Composite Transformations**: Translations-Rotations- Scaling. General Pivot Point Rotation- General Fixed Point Scaling.

UNIT-IV

Two Dimensional Viewing: The Viewing Pipeline- Window to view port Transformation-**Clipping Operations**-Point Clipping -Line Clipping: Cohen Sutherland Line Clipping. Polygon Clipping: Sutherland –Hodgeman Polygon Clipping-Text Clipping.

UNIT-V

Three – Dimensional Display Methods-Parallel Projection- three Dimensional Geometric Transformations: Translation-Rotations- Scaling. **Projections**: Parallel Projections-Perspective Projections. **Visible Surface Detection Methods**: Classification of Visible Surface Detection Algorithms-Back Face Detection-Depth Buffer Method-Depth Buffer Method- Area Sub division Method.

TEXT BOOK

1. Donald Hearn and M. Pauline Baker. 2007. Computer Graphics-C Version, 2nd Edition, Pearson Education, New Delhi.

(Page Nos. : 24-54, 56-77, 80-92, 103-118, 204-215, 236-256, 427-443, 458-463, 490-495, 502-505)

REFERENCES

- 1. Amarendra N. Sinha. 2008. Computer Graphics, 1st Edition, Tata McGraw Hill, New Delhi.
- **2.** Foley, Vandam, Feiner and Hughes. 1999. Computer Graphics Principles and Practices, 2nd Edition, Addison Wesley, Singapore.

- 1. www.cgshelf.com
- 2. www.cg**tutorials**.com
- 3. www.allgraphicdesign.com

- To learn and understand technical aspect of Multimedia Systems.
- To understand the standards available for different audio, video and text applications.
- To Design and develop various Multimedia Systems applicable in real time.
- To learn various multimedia authoring systems.
- To understand various networking aspects used for multimedia applications.
- To develop multimedia application and analyze the performance of the same.

Course Outcomes (COs)

- 1. Developed understanding of technical aspect of Multimedia Systems.
- 2. Understand various file formats for audio, video and text media.
- 3. Develop various Multimedia Systems applicable in real time.
- 4. Design interactive multimedia software.
- 5. Apply various networking protocols for multimedia applications.
- 6. To evaluate multimedia application for its optimum performance.

UNIT-I

Definition of multimedia – Introduction to making multimedia: the stages of a project – Basic software tools-Using Text in multimedia - font editing and design tools – hypermedia and hypertext.

UNIT-II

Introduction to Photoshop 6: Interfaces and Navigation-Tools-Text-Working in Photoshop-Creating new documents-Saving Files.

UNIT-III

Displaying the Images- Using Rulers, Guides and Grids – Making Selections- Layers and Types-Choosing Colors-Creating Brushes- painting & editing Tools- Making and Applying Gradients.

UNIT-IV

Introduction to Flash: Variables & data types- Data types in Action Script-Creating and placing variables – Buttons with text fields.

UNIT-V

Basic Actions: Play, stop, Back & forth- Between frames and scenes – Timelines – External scripts-Loops.

TEXT BOOKS

1. Bill Sanders. 2001. Flash5 Action Script, 1st Edition, DreamTech Press, New Delhi. (Page Nos : 1-19, 20-36, 51-69)

- Steve Romaniello. 2001. Mastering Photoshop 6, 1st Edition, BPB Publications, New Delhi.
 - (Page Nos : 1-16, 21-24, 39-50, 70-79, 107-122, 195-213, 256-289)
- Tay Vaughan. 2008. Multimedia making it Work, 7th Edition, Tata McGraw-Hill, New Delhi. (Page Nos : 1-11, 18-23, 50-56, 262-276)

REFERENCES

- 1. Dinesh Maidasani. 2006. Flash 8, 1st Edition, Firewall Media Publications, New Delhi.
- 2. Robert Shufflebotham. 2004. Photoshop CS in Easy Steps, 1st Edition, DreamTech Pess, New Delhi.
- 3. Ze-Nian Li and Mark S. Drew. 2004. Fundamentals of Multimedia, Pearson Eduction, New Delhi.

- 1. en.wikipedia.org/wiki/Multimedia
- 2. www.arena-multimedia.com/ -
- 3. www.nextwavemultimedia.com/

- To introduce students to the basic concepts and techniques of Data Mining.
- To understand data mining fundamentals and characterize the kinds of patterns that can be discovered by association rule mining
- To compare and evaluate different data mining techniques like classification, prediction, etc.
- To cluster the high dimensional data for better organization of the data
- To describe complex data types with respect to spatial and web mining
- To design data warehouse with dimensional modelling and apply OLAP operations.

Course Outcomes (COs)

Upon completion of this course students will be able to:

- 1. Understand the basic concepts and techniques of Data Mining
- 2. Extract knowledge using data mining techniques and Implement Preprocess the data for mining applications and apply the association rules for mining the data
- 3. Design and deploy appropriate classification techniques
- 4. Understand the concept of clustering and its real time applications
- 5. Explore recent trends in data mining such as web mining, spatial-temporal mining
- 6. Analyze the basic concepts of data warehouse and OLAP operations

UNIT I

Data Mining: Introduction: Basic Data Mining Tasks – Data Mining versus Knowledge Discovery in Database Mining Issues and Mechanisms. Data Mining Techniques: Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT II

Classifications: Bayesian Classification – Distance Based Algorithms – K-Nearest Neighbor. Clustering: K-Means Clustering –Clustering with Genetic Algorithms – Clustering with Neural Networks. Association Rules – Basic Algorithms – Parallel and Distributed Algorithms – Comparing Approaches – Generalized and Multilevel Association Rules. Web Mining: Web Content Mining: Personalization.

UNIT III

Data Warehousing: Introduction – Architecture – System Process-Process Architecture.Design: Database Schema – Partitioning Strategy – Aggregations – Data Marting – Meta Data.

UNIT IV

Hardware and Operational Design : Hardware Architecture – Physical layout – Security – Backup and Recovery – Service Level Agreement – Operating and Data Warehousing.

UNIT V

Capacity planning – Tuning and Data Warehouse – Testing and Data Warehouse – Data Warehouse Futures. Application: Data warehousing and data mining in government: Introduction-national data warehouses-other areas for data warehousing and data mining.

TEXT BOOK

1. Sam Anahory and Dennis Murray. 2009. Data Warehousing in the Real World, Pearson Education, New Delhi.

REFERENCES

- 1. Margaret H. Dunham. 2004. Data Mining Introductory and Advanced Topics, Pearson Education, 2004.
- 2. Pieter Adriaans, Dolf Zantinge. 1998. Data Mining, Addison Wesley.
- 3. Jiawei Han and Micheline Kamber. 2006. Data Mining Concepts and Techniques, 1st Edition, Morgan Kaufmann Publishers, Mumbai.

- 1. Thedacs.Com
- 2. Dwreview.Com
- 3. Pcai.Com
- 4. Eruditionhome.Com

		Semester-V
		LTPC
15CSU505B	BIG DATA	5005
Course Objectives		

- To provide an overview of an exciting growing field of Big Data analytics.
- To discuss the challenges traditional data mining algorithms face when analyzing Big Data.
- To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To introduce to the students several types of big data like social media, web graphs and data streams.
- To enable students to have skills that will help them to solve complex real-world problems in for decision support

Course Outcomes(COs)

- 1. Explain the motivation for big data systems and identify the main sources of Big Data in the real world.
- 2. Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
- 3. Implement several Data Intensive tasks using the Map Reduce Paradigm
- 4. Apply several newer algorithms for Clustering Classifying and finding associations in Big Data
- 5. Design algorithms to analyze Big dat a like streams, Web Graphs and Social Media data.
- 6. Design and implement successful Recommendation engines for enterprises.

UNIT-I

Fundamentals of Big Data - The Evolution of Data Management Understanding the Waves of Managing Data- Defining Big Data - Big Data Management Architecture- The Big Data Journey -Big Data Types-Defining Structured Data-Defining Unstructured Data-Putting Big Data Together.

UNIT-II

Big Data Stack- Basics of Virtualization - The importance of virtualization to big data -Server virtualization - Application virtualization - Network virtualization -Processor and memory virtualization - Data and storage virtualization-Abstraction and Virtualization-Implementing Virtualization to Work with Big Data.

UNIT-III

Hadoop - Hadoop Distributed File System - Hadoop MapReduce- The Hadoop foundation and Ecosystem.

UNIT-IV

Big Data Analytics-Text Analytics and Big Data-Customized Approaches for Analysis of Big Data

UNIT-V

Integrating Data Sources-Real-Time Data Streams and Complex Event Processing-Operationalizing Big Data.

TEXT BOOK

1. Judith Hurwitz, Alan Nugent, Fern Halper, Marcia Kaufman. 2013. Big Data For Dummies, Wiley India, New Delhi.

REFERENCES

- 1. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan. 2012. Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, New Delhi.
- Michael Minelli (Author), Michele Chambers (Author), Ambiga Dhiraj (Author). 2013. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley Publications, New Delhi.
- 3. Zikopoulos, Paul, Chris Eaton. 2011 .Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, New Delhi.

- 1. www.oracle.com/BigData
- 2. www.planet-data.eu/sites/default/files/Big_Data_Tutorial_part4.pdf
- 3. www.ibm.com/developerworks/data
- 4. www.solacesystems.com
- 5. en.wikipedia.org/wiki/Big_data
- 6. www.sap.com/solution/big-data.html

- To Provide a good understanding of the concepts, standards in Cloud computing
- To make the student understand about the cloud service providers and their usage.
- To learn how to secure the data in cloud depending.
- To understand the various service level agreements.
- To understand the cloud using various case studies.
- to portray the recent trends in the field of cloud computing and providing exposures to some open source and commercial clouds.

Course Outcomes (COs)

Upon completion of this course the students will be able to:

- 1. Portray the recent trends in the field of cloud computing and providing exposures to some open source and commercial clouds.
- 2. Know the architecture of the cloud and the usage of clouds.
- 3. Secure their data from the security issues.
- 4. Make the students to work based on the various service level agreements.
- 5. Work with the traditional cloud and Microsoft azure, etc.
- 6. Provide a good understanding of the concepts, standards and protocols in Cloud computing

UNIT-I

First Drive: Introduction-Essentials-Benefits-Why Cloud-Business and IT perspectivecloud and virtualization-cloud service requirements-cloud and dynamic infrastructurecloud computing characteristics-cloud adoption-cloud rediments. **Cloud Deployment Models:** Introduction-Cloud characteristics-Measured service-Cloud deployment models-Security in a public cloud-Public versus Private clouds-cloud infrastructure self-service.

UNIT-II

Cloud as a service: Introduction-Gamut of cloud solutions-Principal technologies-Cloud strategy-Cloud design and implementation using SOA-Conceptual cloud model-Cloud service definitions. **Cloud solutions:** Introduction-Cloud ecosystem-cloud business process management-cloud service management- On-premise cloud orchestration and provisioning engines-computing on demand(CoD)-Cloud sourcing.

UNIT-III

Cloud offerings: Introduction-Information storage, retrieval, archive and protection-Cloud analysis-Testing under cloud-Information security-Virtual desktop infrastructure-Storage cloud. **Cloud management:** Governance-High availability and disaster recovery-Charging models, usage reporting, billing and metering.

UNIT-IV

Cloud virtualization technology: Introduction-Virtualization defined- Virtualization benefits-Server Virtualization- Virtualization for x86 architecture-Hypervisor management software- Virtual infrastructure requirements. **Cloud infrastructure:** Introduction-storage Virtualization-storage area networks- Network-Attached storage-Cloud server Virtualization-networking essential to cloud.

UNIT-V

Cloud and SOA: Introduction-SOA journey to infrastructure-SOA and cloud-SOA defined-SOA and IAAS- SOA-based cloud infrastructure steps. **Cloud mobility:** Introduction-the business problem-Mobile enterprise application platform-Mobile application architecture overview.

TEXT BOOK

1. Dr Kumar Saurabh.2012. Cloud Computing, 2nd Edition, Wiley India.

REFERENCES

- 1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter. 2010. Cloud Computing Practical Approach, 1st Edition, Tata McGraw Hill, New Delhi.
- 2. Barrie Sosinsky .2010. Cloud Computing Bible, Wiley- India
- 3. Rajkumar Buyya, James Broberg, Andrzej M Goscinski. 2011. Tata Mc-Graw Hill, New Delhi.
- 4. Ronald L. Krutz, Russell Dean Vines. 2010. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley -India

- 1. en.wikipedia.org/wiki/Cloud_computing
- 2. www.ibm.com/cloud-computing/in/en/
- 3. www.oracle.com/CloudComputing
- 4. www.microsoft.com/en-us/cloud/default.aspx

- To understand the visual platform and apply the power of .Net technologies in programming
- To Create windows forms using arrays and flow control statements.
- To Learn to use Basic windows controls using Visual Basic.Net
- To Learn to use the classes and namespaces in the .NET Framework class library.
- To Develop Web Applications using Microsoft ASP.NET programming.
- To Understand the concept of Multiple Document Interface and the architecture of .NET

Course Outcomes (COs)

Upon completion of this course the students will be able to:

- 7. Develop Windows based applications using Visual Basic.Net
- 8. Learn various tools in .net applications
- 9. Differentiate between the types of applications supported by .Net
- 10. Implement ADO.Net concept in VB.Net and ASP.Net applications
- 11. Create server side web applications using ASP.NET
- 12. Understand the concept of data sources and data bound controls in VB.NET and ASP.NET

VB.Net

- 1. Calculate Simple interest and compound Interest
- 2. Find mouse events and coordinates where the mouse is clicked.
- 3. Implement Notepad
- 4. Draw several shapes and fill with color.
- 5. Perform the following in list box
 - a) Add an item
 - b) Delete an item
 - c) List count
 - d) Clear the List
- 6. Calculate the days elapsed between the given two dates.
- 7. Create Menu and link multiple forms with different colors.
- 8. Animate the picture using animation control.
- 9. Implement Employee Payroll using ADO.
- 10. Create and manipulate a File.

ASP.Net

- 11. Write a program to create a Web-based calculator.
- 12. Write a program for database connectivity to retrieve student information.
- 13. Write a program to retrieve Cookies information.
- 14. Write a program to count web page hits.
- 15. Write a program to find Fibonacci series and Factorial of a given number.

150EU501

E-LEARNING

Course Objectives

- To give the students a basic understanding of e-learning.
- To understand the standards available for different audio, video and text applications.
- To develop simple animations using Flash.
- To include audio files in animations and edit them in sound forge.
- To create and edit video files using Adobe Premiere
- To develop multimedia application and analyze the performance of the same.

Course Outcomes (COs)

- 1. Developed understanding of technical aspect of E-Learning.
- 2. Understand various file formats for audio, video and text media.
- 3. Develop simple animations using Flash.
- 4. Include audio files in animations and edit them in sound forge.
- 5. Create and edit video files using Adobe Premiere
- 6. Evaluate multimedia application for its optimum performance.

UNIT-I

E-Learning Evolution - Advantages and Disadvantages of E-Learning - Instructional design Models for E-Learning - Applying User-Centered Design to E-Learning - Methods and Measures to Retain Students Enrolled in Online Education -Choosing an Effective Communication Tool.

UNIT-II

Flash : Geometric shape tools – Drawing tools- fill and stroke controls- Selection Tools.

UNIT-III

Creating Animation and Effects: Animation strategies – TimeLine Animation – Character animation Techniques – fundamentals of Editing.

UNIT-IV

Sound: Import and Export formats – Importing sound to flash – adding sound to timeline – synchronizing audio to animations- stopping sounds – Working with sound forge.

UNIT-V

Video: Integrating and Importing Video – Editing video with Adobe Premiere – Organizing & Editing clips – Adding Transition between clips – Adding special effects to video.

TEXT BOOKS

1. Robert ReinHardt and Snow Dowd. 2006. MacroMedia flash 8 Bible, 1st Edition, Wiley India (P) Ltd, New Delhi.

(Page Nos.:111 -146, 309-323, 325-349, 423-428, 461-476, 545-567)

 Pamela Berman, institute for Interactive Technologies, Bloomsburg University of Pennsylvania, USA (e-book), 2006, E-Learning Concepts and Techniques. (Page Nos.:1-7, 13-17)

REFERENCES

- 1. Dinesh Maidasani. 2006. Flash 8, 1st Edition, Firewall Media Publications, New Delhi.
- 2. Fred T.Hofstetter. 2001. MultiMedia Literacy, Tata McGraw Hill, New Delhi.
- 3. NIIT. 2004. A guide to film Making with Software tools Adobe Premier and Sound forge, Prentice Hall of India, New Delhi.
- 4. Tay Vaughan. 2008. Multimedia making it work, 7th Edition, Tata McGraw-Hill, New Delhi.

- 1. iit.bloomu.edu/spring2006_ebook_files/ebook_spring2006.pdf (E-Learning Concepts and Techniques)
- 2. en.wikipedia.org/wiki/Multimedia
- 3. www.arena-multimedia.com/ -
- 4. www.nextwavemultimedia.com/
- 5. http://www.bmf.hu/conferences/mtn2005/Bucko.pdf

		Semester-VI
		LTPC
15CSU601	SOFTWARE ENGINEERING	5005

- To Apply their knowledge of mathematics, sciences, and computer science to the modeling, analysis, and measurement of software artifacts.
- To Work effectively as leader/member of a development team to deliver quality software artifacts.
- To Analyze, specify and document software requirements for a software system.
- To Implement a given software design using sound development practices.
- To Verify, validate, assess and assure the quality of software artifacts.
- To Design, select and apply the most appropriate software engineering process for a given project, plan for a software project, identify its scope and risks, and estimate its cost and time.

Course Outcomes(COs)

- 1. Apply their knowledge of mathematics, sciences, and computer science to the modeling, analysis, and measurement of software artifacts.
- 2. Analyze, specify and document software requirements for a software system.
- 3. Implement a given software design using sound development practices.
- 4. Verify, validate, assess and assure the quality of software artifacts.
- 5. Design, select and apply the most appropriate software engineering process for a given project, plan for a software project, identify its scope and risks, and estimate its cost and time.
- 6. Express and understand the importance of negotiation, effective work habits, leadership, and good communication with stakeholders, in written and oral forms, in a typical software development environment.

UNIT-I

Introduction to Software Engineering: The Evolving Role of Software-Software-Software Myths- A Generic View of process: Software Engineering –A Layered Technology-Process Models: Prescriptive Models- Waterfall Model- Incremental process Models. Evolutionary Process Models: Prototyping, The Spiral Model. Specialized process Models

UNIT-II

Building the Analysis Model: Requirements Analysis-Analysis Modeling Approaches-Data Modeling Concepts: Data Objects-Date attributes-Relationships Cardinality and Modality-Flow Oriented Modeling: Creating Data Flow Model-Creating a Control Flow Model-The Control Specification-The Process Specification- Creating a Behavioral Model.

UNIT-III

Design Engineering: Design with the Context of Software Engineering-Design Process and Design Quality-Design Concepts-Creating An Architectural Design: Software Architecture-Data Design-Architectural Design- Assessing Alternative Architectural Designs-Mapping Data Flow into Software Architecture.

UNIT-IV

Performing User Interface Design: The Golden Rules: Place the User in Control-Reduce the User's Memory Load-Make the Interface Consistent- User Interface Analysis and Design: Interface Analysis and Design Models- The Process- Interface Analysis: User Analysis - Task analysis and Modeling. Interface Design Concepts-Applying Interface Design Steps-User Interface Design Patterns-Design Issues –Design Evolution.

UNIT-V

Testing Tactics: Software Testing Fundamentals- Black -Box and White-Box Testing-White Box Testing-Basis Path Testing- Control Structure Testing: Condition Testing-Data Flow Testing-Loop Testing- Black Box Testing- Quality Concepts: Quality- Quality Control –Quality Assurance –Cost Of Quality.

TEXT BOOKS

 Roger S. Pressman. 2010. Software Engineering – A Practitioner's Approach, 7th Edition, McGraw Hill International Edition, New Delhi. (Page Nos .: 34-93, 208-215, 226-232, 248-250, 259-271, 287-298, 304-306, 356-381, 420-439, 462-464)

REFERENCES

- 1. Ian Summerville. 2005. Software Engineering 6th Edition, Pearson Education Publication, New Delhi.Daniel Hoffman and Paul Strooner. 2006. Software Design Automated Testing and Maintenance, Thomson Publications, Asia.
- 2. Kalkar S.A. 2007. Software Engineering a Concise Study, 1st edition, Prentice Hall of India, New Delhi.
- 3. Richard Fairley. 1998. Software Engineering Concepts, 1st Edition, Tata McGraw Hill Publishing, New Delhi.
- 4. Stephen Schach. 2007. Software Engineering, 7th Edition, Tata McGraw Hill, New Delhi.

- 1. http://en.wikipedia.org/wiki/Software_engineering
- 2. http://www.onesmartclick.com/engineering/software-engineering.html
- 3. http://www.cc.gatech.edu/classes/AY2000/cs3802_fall/

- To understand the fundamentals of HTML and use different formatting options
- To creation of tables and frames
- To relate with DHTML and CSS
- To develop open source applications that deal with database and website development.
- To establish a working environment for PHP web page development
- To get Familiar with GUI, coded, modified controls

Course Outcomes(COs)

- 1. Understand the fundamentals of HTML and use different formatting options
- 2. Creation of tables and frames
- 3. Relate with DHTML and CSS
- 4. Develop open source applications that deal with database and website development.
- 5. Establish a working environment for PHP web page development
- 6. Familiarity with GUI, coded, modified controls

UNIT-I

HTML: Introduction to HTML- History Of HTML-Structure of HTML-Formatting Text :Font type, Font Size, Big ,Small, bold ,italic, color, superscript , Subscript, striking out, Underlining the text , Predefined fonts , Pre formatted Text, Blinking Text and Block Quotes. Lists: Ordered, Unordered and Definition List. Creating Link - Images. Tables: Creating Table –Dividing Table into Columns- Dividing Table into Rows- Creating Headers- Adding Border –Putting a Background Image- Heading across two or more columns- Changing color of the cell-aligning the content –Display of Tables. Frames

UNIT-II

Forms: Working with forms-Creating forms-working with menus- working with Radio buttons- check boxes-textboxes-text areas- password boxes-submit button-Resetting the form. DHTML: Heading and Horizontal line-Hidden Message-Message at the center of the page- Moving Boxes- Changeable Box- CSS: Introduction- Creating Style Sheets-Common Tasks with CSS- Colors-The Font Family.

UNIT-III

JavaScript: Introduction-Operators-Starting with JavaScript- Using Quotes-Using Alerts-Functions-Variables-data types- Statements-Comments. Objects: Working with Objects-Date Object-Math Object-String Object--Handling Events in JavaScript-Event Handling attributes-Window Events-Window Object – Document Object-Navigator Object

UNIT-IV

PHP: Introduction-What is PHP?-Why PHP?-Basic PHP syntax-Comments in PHP-PHP5 varaiables-PHP5 echo and Print Statements- How Online PHP Programs Runs-PHP Datatypes-PHP String Functions

UNIT-V

Functions-Arrays-PHP Form Handling-GET,POST Methods-Form Validation-PHP File Handling-PHP Exception Handling. MySQL: Introduction to MySQL -Connecting to MySQL from a PHP application- Inserting and updating records in table- Deleting and retrieving data from table.

TEXT BOOK

- 1. Ramesh Bangia. 2008. Web Technology, 1st Edition, Firewall Media Publications, New Delhi (Chapters : 4,5,6 and11)
- 2. Dave W.Mercer, Allan Kent, Steven D.Nowicki, Davd Mercer, Dan Squie, Wankyu Choi.2006. Beginning PHP5. Wiley India (P) Ltd, New Delhi

REFERENCES

- 1. Deitel H.M., P.J.Deitel and A.B.Goldberg. 2007. Internet & World Wide Web, 3rd Edition, Pearson Education Asia, New Delhi.
- 2. Jeffrey C. Jackson. 2007. Web Technologies, 3rd Edition, Pearson Education Publishers, New Delhi.
- 3. Rohit Khurana. 2002. JavaScript, 1st Edition, A.P.H Publishing, New Delhi.
- 4. Xavier C. 2003. Web Technology and Design, 1st Edition, New Age International Publishers, New Delhi.
- 5. Luke welling, Laura Thomson, 2010. PHP and MySQL Web Development, 4th Edition, Pearson education.
- 6. Tim Converse & Joyce Park with Clark Morgan . 2006. PHP5 & MySQL Bible, 1st Edition, John Wily, India.

- 1. www.w3schools.com/
- 2. alexle.net/archives/category/web-technolgy
- 3. jmarshall.com/easy/
- 4. www.php.net/
- 5. en.wikipedia.org/wiki/PHP
- 6. www.w3schools.com/PHP/DEfaULT.asP

		Semester-VI
		LTPC
15CSU603A	OPEN SOURCE SOFTWARE	5005

- To identify the licensing of open source systems and make decisions on their use, based on an understanding of the legal, economical and technical issues.
- To find open source projects related to a given development problem.
- To install from source code an open source project and start using it.
- To choose the correct license, development model, and development community for open source projects, and can initiate a new project or join an existing project.
- To understand the OSS Perl and its fundamental concepts
- To develop a Perl application and connect it to MySQL

Course Outcomes(COs)

- 1. Can identify the licensing of open source systems and make decisions on their use, based on an understanding of the legal, economical and technical issues.
- 2. Can find open source projects related to a given development problem.
- 3. Can install from source code an open source project and start using it.
- 4. Can choose the correct license, development model, and development community for open source projects, and can initiate a new project or join an existing project.
- 5. Understand the OSS Perl and its fundamental concepts
- 6. Can develop a Perl application and connect it to MySQL

UNIT I

Overview of Free/ Open Source Software: The Open Source Definition - Examples of OSD Compliant Licenses - Examples of Open Source Software Product – The Open Source Software Development Process – A History of Open Source software: The Berkeley Software Distribution – The Free Software Foundation – Linux – Apache – Mozilla – Open Source Software.

UNIT II

Qualification: Defining Open Source Software – Categorizing Defining Open Source Software – Specific Characteristics of Open Source Software Transformation: The OSS Development Process – Taboos and Norms in OSS Development – The OSS Development Life Cycle – Deriving a Framework for Analyzing OSS – Zachman''s Framework for IS Architecture – CATWOE and Soft System Method – Deriving the Analytical Framework for OSS.

UNIT III

Environment: The "where" of OSS – the "when" of OSS – World View: A Framework for classifying OSS Motivations – Technological Micro-level (individual) motivation – Economic Micro-level and Macro-level (individual) Motivation – Socio-political Micro-level and Macro-level (individual) Motivation.

Open Source Server Applications: Infrastructure Services – Web Services – Database Servers – Mail Servers – Systems Management – Open Source Desktop Applications: Introduction – Graphical Desktops – Web Browsers – The Office Suite – Mail and Calendar Clients – Personal Software – Cost of OSS: Total Cost of Ownership – Types of Costs Licensing: Types of Licenses – Licenses in Use – Mixing Open and Close Code – Dual Licensing.

UNIT IV

Perl Programming

Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgilib for Forms.

UNIT V

File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories.

Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

TEXT BOOK

1. Joseph Feller, Brain Fitzgerald, Eric S. Raymond, "Understanding Open Source Software Development", Addison-Wesley Professional, 1st Edition, 2001.

2. Perl CookBook –Tom Christinasen & Nathan Torkington, O"Relliy, SPD Pvt ltd, 2006 Edition.

REFERENCES

1. PHP 5 and MySQL Bible Wiley Dream teck India Pvt.ltd 2006 Edition.

- 1. www.php.net/
- 2. en.wikipedia.org/wiki/PHP
- 3. www.w3schools.com/PHP/DEfaULT.asP

- To state the basic concepts in information security, including security policies, security models, and security mechanisms.
- To provide an exposure to the spectrum of security activities methods methodologies and procedures with emphasis on practical aspects of Information Security.
- To understand principles of web security.
- To gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
- To understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.
- To provide the learner will be able to examine secure software development practices.

Course Outcomes (COs)

A student who successfully completes this course should at a minimum be able to:

- 1. State the basic concepts in information security, including security policies, security models, and security mechanisms.
- 2. Explain concepts related to applied cryptography including the four techniques for crypto-analysis symmetric and asymmetric cryptography, digital signature, message authentication code, hash functions and modes of encryption operations.
- 3. Explain common vulnerabilities in computer programs including buffer overflow Vulnerabilities time-of-check to time-of-use flaws incomplete mediation.
- 4. The learner will gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
- 5. The learner will understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.
- 6. The learner will be able to examine secure software development practices.

UNIT-I

Introduction to cybercrime: Introduction-Cybercrime: Definition and Information Security-who are cybercriminals? - Classification of cybercrimes. Cybercrime: The legal perspectives- cybercrimes: An Indian Perspective - cybercrime and the Indian ITA2000: Hacking and the Indian law(s) - A Global Perspective on cybercrimes: cybercrime and the Extended Enterprise - cybercrime Era: Survival Mantra for the Netizens - Concluding Remarks and Way Forward to Further Chapters.

UNIT-II

Cyberoffenses: How Criminals Plan Them: Introduction: categories of Cybercrime -How criminals Plan the Attacks: Reconnaissance, Passive Attacks, Active Attacks, Scanning and Scrutinizing Gathered Information, Attack (Gaining and Maintaining the system Access) -social Engineering: Classification of Social Engineering - Cyberstalking: Types

of stalkers, Cases Reported on Cyberstalking, How stalking Works?, real-life incident of Cyberstalking -Cybercafe and Cybercrimes

UNIT-III

Cybercrime: Mobile and wireless Devices-Introduction - Proliferation of Mobile and Wireless Devices - Trends in Mobility-Credit Card Frauds in Mobile and Wireless Computing Era: Types and Techniques of Credit Card Frauds - Security challenges Posed by Mobile Devices - Registry Settings for Mobile Devices - Authentication Service security: cryptographic security, LDAP Security, RAS Security, Media Player Control Security, Networking API Security.

UNIT-IV

Mobile Devices: Security Implication for Organizations – Managing Diversity and Proliferation of Hand-Held Devices, Unconventional/ Steath Storage Devices, Threats through Lost and Stolen Devices, Protecting Data on lost devices, Educating the Laptop Users - Organizational Measures for Handling Mobile devices - Related Security Issues:

UNIT-V

Encrypting Organization Databases, Including Mobile Devices in Security Strategy -Organizational Security Policies and Measures in mobile Computing Era: Importance of Security polices relating to mobile Computing Devices, Operating Guidelines for Implementing Mobile Devices Security Polices, Organizational Policies for the Use of Mobile Hand - Held Devices - Laptops: Physical Security Countermeasures.

TEXT BOOK

1. Nina Godbole and Sunit Belapure. 2013. CYBER SECURITY. Wiley India Pvt. Ltd.

REFERENCES

- 1. Charles P. Pfleeger and Shari L. Pfleeger. 2003.
- 2. Dieter Gollmann . 2006. Computer Security. 2nd Edition . John Wiley & Sons.
- 3. Godbole, N. (2009) Information Systems Security :Metrics, Frameworks and Best Practices, Wiley India, New Delhi.
- 4. T. Marther, S. Kumaraswamy and S. Latif (2009). Cloud Security and Privacy: An Enterprise Perceptive on Risk and Complaince, O'Reilly.

- 1. http://www.csc.ncsu.edu/faculty/ning
- 2. csrc.nist.gov/publications/nistpubs/800-12/handbook.pdf
- 3. www2.warwick.ac.uk/fac/sci/dcs/teaching/modules/cs134/

- To comprehend the basic concepts of the client-server model.
- To understand how client-server systems work.
- To differentiate between two-tier and three-tier architectures.
- To improve the performance and reliability of client server based systems.
- To identify security and ethical issues in client server computing
- To understand contemporary terminology, progress, issues, and trends of client server systems.

Course Outcomes (COs)

- 1. Comprehend the basic concepts of the client-server model.
- 2. Understand how Client-Server systems work.
- 3. Differentiate between two-tier and three-tier architectures.
- 4. Improve the performance and reliability of Client Server based systems.
- 5. Identify security and ethical issues in Client Server Computing
- 6. Ability to understand contemporary terminology, progress, issues, and trends of Client Server Systems.

UNIT-I Client/Server Computing

What is client/server-types of servers-FAT server-Fat clients-2tier vs 3-tier.client/server building blocks

UNIT-II Clients, Servers & Operating Systems

NOS Creating the single system image-RPC, Messaging and peer-to-peer

UNIT-III SQL Database servers

SQL Middleware and Federated Database-Data Warehouses

UNIT-IV Client/Server Transaction

Processing: The magic of transaction-TP monitors-TP Lite or TP heavy-TP Monitors: Meet the players

UNIT-V Client/Server Groupware

CORBA-Client/Server and the Internet: web client/server The Interactive eraclient/server distributed system management

Text Book

1. Robert Orfali, Dan Harkey, Jeri Edwards,"Client/Server Survival Guide",3rd edition,Wiley India pvt Ltd,2008

Reference Books

1) Neil Jenkins et al, "Client/Server Unleashed", Techmedia, 1998 Satyapriya Battacharjee, "A Textbook of Client/Server Computing", 1st edition, Dominant Publishers & Distributors, 2001

2) Larry T.Vaughn,"Client/Server System Design & Implementation",Mc Graw Hill Inc,1995 Alex Berson,"Client/Server Architecture", Mc Graw Hill Inc,1994

15CSU611

WEB DESIGNING LAB

Course Objectives

- To understand the fundamentals of HTML and use different formatting options
- To creation of tables and frames
- To relate with DHTML and CSS
- To develop open source applications that deal with database and website development.
- To establish a working environment for PHP web page development
- To get Familiar with GUI, coded, modified controls

Course Outcomes(COs)

- 1. Understand the fundamentals of HTML and use different formatting options
- 2. Creation of tables and frames
- 3. Relate with DHTML and CSS
- 4. Develop open source applications that deal with database and website development.
- 5. Establish a working environment for PHP web page development
- 6. Familiarity with GUI, coded, modified controls
- 1. Create a HTML document which includes an unordered list, ordered list, definition list to your document and create a link to Yahoo.
- 2. Create a table in HTML document with following formats
 - table with no borders
 - display table headers
 - to handle cells that have no content
 - table cells that span more than one row or one column
 - Adding background image to a table.
- 3. Develop a HTML page to display an advertisement.
- 4. Develop a HTML page to input information to create a mail id.
- 5. Create a DHTML page using Various Filter on images, mask images, mask text
- 6. Create a DHTML page to change background color of a dropdown list and to shake an image.
- 7. Develop a Web page using Java script to perform the following information
 - Input student information.
 - Display student results for a given roll number.
- 8. Develop a web page for online exam using Java Script.
- 9. Design a form to submit your resume in net using PHP.
- 10. Design an application to display cookies information using PHP
- 11. Write a program to count web page hits.
- 12. Design an application for creating an online Advertisement.

- To make effective use of Java generic types.
- To write multi-threaded Java applications.
- To use the Reflection API for highly generic tasks, discovery, or code-generation.
- To use standard annotations and develop custom annotations to express meta-data in Java source files.
- To communicate between processes using network sockets.
- To create JDBC applications and connect them with other applications

Course Outcomes (COs)

- 1. Make effective use of Java generic types.
- 2. Write multi-threaded Java applications.
- 3. Use the Reflection API for highly generic tasks, discovery, or code-generation.
- 4. Use standard annotations and develop custom annotations to express meta-data in Java source files.
- 5. Communicate between processes using network sockets.
- 6. Create JDBC applications and connect them with other applications

UNIT-I

Graphics and Java2D: Graphics Contexts and graphics Objects – Color Control – Font Control – Drawing Lines, Rectangles, Ovals, Arcs, Polygons and Polylines – Java2D API. Graphical User Interface Components: Overview of Swing Components- JLabel – EventHandling – Textfields – How event handling works – JButton – JCheckBox and JRadioButton – JComboBox – JList – Multiple-Selection Lists – Mouse Event Handling – Adapter classes – Key Event Handling – Layout Managers – Panels – JTextArea – JPanel – JSlider – Using Menus with Frames – JPopupMenu – Pluggable Look-and-Feel.

UNIT-II

Exception Handling: Java Exception Hierarchy – Rethrowing and Exception – finally Clause – printStackTrace, getStackTrace and getMessage – Chained Exceptions.

Multithreading: Life Cycle of a Thread – Thread Priorities and Thread Scheduling – Creating and Executing Thread – Thread Synchronization – Daemon Threads – Runnable Interface. Files and Streams: Data Hierarchy – Files and Streams – Class File – Creating a Sequential-Access File – Reading Data from a Sequential-Access File – Random-Access Files – Creating/Writing/Reading Random-Access Files – New I/O APIs for the Java Platform.

UNIT-III

Java Utilities Package and Bit Manipulation: Vector Class and Enumeration Interface – Stack Class of Package java.util – Hashtable Class – Properties Class – Bit Manipulation and the Bitewise Operators – BitSet Class. Collections: Collections Overview – Class Arrays – Interface Collection and Class Collections – Lists – Sets – Maps.

UNIT-IV

Networking: Manipulating URLs – Reading a File on a Web Server –Client/Server Interaction with Stream Socket Connections. Multimedia: Loading,

Displaying and Scaling Images – Animating a series of Images – Image Maps – Loading and Playing Audio Clips.

UNIT-V

Java Database Connectivity with JDBC: Relational Database Overview – SQL – Manipulating Databases with JDBC – Stored Procedures. Servlets: Servlet Overview and Architecture – Handling HTTP get /post Requests - Redirecting Requests to other Resources – Multi-Tier Applications. JavaServer Pages: JavaServer Pages Overview – Implicit Objects – Scripting – Standard Actions – Directives.

TEXT BOOK

1. Deitel & Deitel. 2007. Java How to Program, 6th Edition, Pearson Education Asia, New Delhi.

(Page Nos.: 32 – 58, 98-100, 121-193, 216-250, 280-306, 341-384, 400-427, 440-485, 505-543, 569-594, 611-663, 679-707, 751-770, 778-814,833-897, 914-927,1014-1025, 1098-1137, 1142-1167, 1178-1212, 1223-1249)

REFERENCES

- 1. Aaron walsh, Justin couch & Daniel H.Steinberg. 2000. Java 2 Programming, IDG Books India (P) Ltd., New Delhi.
- 2. Balagurusamy.E. 2000. Programming with Java, Tata Mc-Graw Hill, New Delhi.
- 3. Herbert Schildt, 2000. Java Complete Reference, Tata McGraw Hill, New Delhi.
- ISRD Group. 2007. Introduction to Object Oriented Programming through Java, 1st Edition, Tata McGraw Hill, New Delhi.

- 1. java.sun.com/docs/books/tutorial/
- 2. www.en.wikipedia.org/wiki/Java
- 3. www.java.net/

- To have an architectural overview of the TCP/IP Protocol Suite
- To understand about subnets using IP classes
- To understand the key features and functions of ARP Protocol.
- To understand how basic routing protocol works.
- To understand about DNS and its applications
- To understand the concepts of Remote Login and VPN

Course Outcomes (COs)

At the completion of the course, students will:

- 1. Identify the functions/ services of TCP/IP component and layer
- 2. Have the ability to analyze and differentiate networking protocols used in TCP/IP protocol suite.
- 3. Understand the routing IP datagrams and checksum.
- 4. Exposed to unicast and multicast routing.
- 5. Learn about services and operations of DHCP Servers and Domain Name Servers
- 6. Understand about SMTP and SNMP.

UNIT-I

Introduction: WAN, WAN technologies - Internetworking concepts - Protocols and Standards - TCP/IP protocol suite - Internetworking Devices - Routing Concept - Classful IP Addressing - Subnetting - Supernetting - Classless Addressing

UNIT-II

ARP & RARP – Proxy ARP – ARP over ATM – ARP and RARP Protocol Format. IP Datagram – Fragmentation – Options – IP Datagram Format – Routing IP Datagrams – Checksum. ICMP – Types of Messages - Message Format – Error Reporting – Query – Checksum - ICMP Package

UNIT-III

Unicast Routing Protocol: Intra Domain and Inter Domain Routing – Distance Vector Routing – RIP – Link State Routing – OSPF – Path Vector Routing – BGP – Multicast Routing – Multicast Routing Protocols. Group Management – IGMP Message – IGMP Operation – Process to Process Communication – UDP Operation – TCP Services - Flow Control.

UNIT-IV

BOOTP - DHCP – Address Discovery and Binding. DNS – Name Space – DNS in Internet – Resolution – Resource Records.

UNIT-V

Remote Login - FTP - SMTP - SNMP. IP over ATM Wan - Cells - Routing the Cells - ATMARP - Logical IP Subnets. Mobile IP : Addressing - Agents - Agent discovery - Registration - Data Transfer - VPN

TEXT BOOK

 Behrouz A. Forouzan. 2009. TCP/IP Protocol Suite. 4th Edition, Tata McGraw Hill Publication, New Delhi. (Page Nos: 2-5, 6-38, 69-74, 84-95, 102-121, 160-188, 191-1-201, 221-232, 238-241,

256-279, 299-304, 386-430, 441-444, 457-464, 471-488, 519-542, 561-566, 575-576, 621-632, 637-644, 680-682)

REFERENCES

- 1. Andrews S. Tanenbaum. 2003. Computer Networks, 4th Edition, Prentice Hall of India Private Ltd., New Delhi.
- 2. Buck Graham. 2007. TCP/IP Addressing, 2nd Edition, Harcount India Private Limited, New Delhi.
- 3. Douglas E. Comer. 2000. Computer Networks and Internets, 4th Edition. Pearson Education, New Delhi.
- 4. William Stallings. 2007. Data and Communication Network, 8th Edition, Tata McGraw Hill, New Delhi.

- 1. en.wikipedia.org/wiki/Internet_protocol_suite
- 2. http://docwiki.cisco.com/wiki/Introduction_to_WAN_Technologies
- 3. www.yale.edu/pclt/COMM/TCPIP.HTM
- 4. www.w3schools.com/tcpip/default.asp

15CSU507

Course Objectives

- To know the types of mobile wireless technologies that are currently being used
- To know the evolution of Mobile communication and cell concept to improve capacity of the system.
- To know the fading mechanism and types of fading and effect of fading on Mobile communication.
- To know the role of equalization in Mobile communication and to study different types of Equalizers and Diversity techniques.
- To know the types of channel coding techniques, data transmission modes and services of GSM.
- To know the types of channel coding techniques, data transmission modes and services of CDMA

Course Outcomes (COs)

- Know the types of mobile wireless technologies that are currently being used
- Know the evolution of mobile communication and cell concept to improve capacity of the system.
- Know the fading mechanism and types of fading and effect of fading on mobile communication.
- Understand the role of equalization in mobile communication and to study different types of equalizers and diversity techniques.
- Know the types of channel coding techniques, data transmission modes and services of GSM.
- Know the types of channel coding techniques, data transmission modes and services of CDMA

UNIT I

Wireless Communication :Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II

Wireless Networks : Wireless LAN – IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III

Mobile Communication Systems : GSM-architecture-Location tracking and call setup-Mobility management- Handover- Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –-Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-
attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing

UNIT IV

Mobile Network And Transport Layers : Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V

Application Layer : WAP Model- Mobile Location based services -WAP Gateway – WAP protocols – WAP user agent profile- caching model-wireless bearers for WAP -WML – WMLScripts – WTA - iMode- SyncML.

TEXT BOOKS:

Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
William Stallings, "Wireless Communications and Networks", Pearson Education, 2002.

REFERENCES:

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2003.

2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.

3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

15CSU605

SOFT COMPUTING

Course Objectives

- To understand the scope and evolution of soft computing
- To learn the various soft computing frame works
- To be familiar with design of various neural networks
- To be exposed to fuzzy sets and fuzzy logic
- To understand fuzzy measures and reasoning
- To learn genetic programming.

Course Outcomes(COs)

- 1. Understand the scope and evolution of soft computing
- 2. Learn the various soft computing frame works
- 3. Be familiar with design of various neural networks
- 4. Be exposed to fuzzy sets and fuzzy logic
- 5. Understand fuzzy measures and reasoning
- 6. Learn genetic programming.

UNIT-I

Introduction : Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence – Neural Networks - Scope and Evolution– Models of Neural Networks – Feed forward Networks – Supervised Learning Neural Networks – Associative memory networks – Unsupervised learning networks – Special Networks.

UNIT-II

Fuzzy Sets and Fuzzy Logic : Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations - Fuzzy Rules Non – interactive fuzzy sets – Fuzzification– Intuition, inference, Rank ordering – Defuzzification – Max-membership principle, centroid method, center of sums, center of largest area.

UNIT-III

Fuzzy Measures and Reasoning: Fuzzy arithmetic and measures – Fuzzy reasoning – approximate reasoning – categorical, qualitative, syllogistic, dispositional – Fuzzy inference systems – fuzzy decision making – individual, multiperson, multi objective, Bayesian – fuzzy logic control system – architecture, model and application.

UNIT-IV

Machine Learning And Genetic Algorithm : Machine Learning Techniques – Machine Learning Using Neural Nets – Genetic Algorithms (GA) – Simple and General GA – Classification of Genetic Algorithm – Messy, Adaptive, Hybrid, Parallel – Holland Classifier System.

UNIT-V

Application and Implementation Soft Computing: Genetic algorithms -. Traveling Salesperson Problem, Internet Search Techniques – Fuzzy Controllers – Bayesian Belief networks for Rocket Engine Control – Neural Network, Genetic algorithm and Fuzzy logic implementation in C++ and Matlab.

TEXT BOOK

1.S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", Wiley India Ltd., First Indian Edition, 2007

REFERENCES

1.Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.

2. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

3. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.

4. Amit Konar, "Artificial Intelligence and Soft Computing", First Edition, CRC Press, 2000.

5. Simon Haykin, "Neural Networks: A Comprehensive Foundation", Second Edition Prentice Hall, 1999.

6. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.

7. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.

WEB SITES

- 1. www.amazon.in/soft+computing
- 2. www.soft-computing.de/def.html
- 3. en.wikipedia.org/wiki/Soft_computing
- 4. endnote.com/downloads/style/applied-soft-computing
- 5. www.allbookez.com/soft-computing-lecture-notes/