AMET
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Deemed to be University Under Section 3 of UGC Act 1956

B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS

CURRICULUM AND SYLLABUS

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Sl. No.	Course Code	Course Title	Contact Hours	L	T	P	C	Marks
SEMESTER-I								
THEORY								
1	UCSBS01	Business Communication and Value Science	2	2	0	0	2	100
2	UCSBS02	Linear Algebra & Calculus	4	4	0	0	4	100
3	UCSBS03	Digital system Design	3	3	0	0	3	100
4	UCSBS04	Problem Solving and Programming using C	3	3	0	0	3	100
5	UCSBS05	Introduction to Linux	3	3	0	0	3	100
PRACTICAL								
6	UCSBS1PA	Problem Solving and Programming using C Lab	4	0	0	4	2	100
7	UCSBS1PB	Linux Lab	4	0	0	4	2	100
8	UCSBS1PC	Communicative skills and language laboratory	2	0	0	2	1	100
TOTAL			**25**	**15**	**0**	**10**	**20**	
SEMESTER-II								
THEORY								
1	UCSBS21	Probability and Statistics	4	4	0	0	4	100

2	UCSBS22	Database Management Systems	3	3	0	0	3	100
3	UCSBS23	OOPS with C++	3	3	0	0	3	100
4	UCSBS24	Principles of management	3	3	0	0	3	100
5	UCSBS25	Computer Organization & Architecture	3	3	0	0	3	100
6	UCSBS26	Environmental Science	2	2	0	0	2	100
PRACTICAL								
7	UCSBS2PA	OOPS with C++ lab	4	0	0	4	2	100
8	UCSBS2PB	Database Management Systems Lab	4	0	0	4	2	100
		TOTAL	**26**	**18**	**0**	**8**	**22**	
SEMESTER-III								
THEORY								
1	UCSBS31	Discrete Mathematics	4	4	0	0	4	100
2	UCSBS32	Java and Internet Programming	3	3	0	0	3	100
3	UCSBS33	Operating Systems	3	3	0	0	3	100
4	UCSBS34	Machine Learning	3	3	0	0	3	100
5	UCSBS35	Data Communication and Networking	3	3	0	0	3	100
6	UCSBS36	Design and analysis of algorithms	3	3	0	0	3	100
PRACTICAL								
7	UCSBS3PA	Java and Internet Programming Laboratory	4	0	0	4	2	100

8	UCSBS3PB	Machine Learning Laboratory	4	0	0	4	2	100
TOTAL			**27**	**19**	**0**	**8**	**23**	
SEMESTER-IV								
THEORY								
1	UCSBS41	Cloud computing	3	3	0	0	3	100
2	UCSBS42	Advanced Database Technologies	3	3	0	0	3	100
3	UCSBS43	Deep Learning	3	3	0	0	3	100
4	UCSBS44	Business intelligence	3	3	0	0	3	100
5	UCSBS45	Big Data Analytics	3	3	0	0	3	100
6		**Professional Elective-I**	3	3	0	0	3	100
PRACTICAL								
7	UCSBS4PA	Cloud Computing Laboratory	4	0	0	4	2	100
8	UCSBS4PB	Deep Learning Lab	4	0	0	4	2	100
			26	**18**	**0**	**8**	**22**	
SEMESTER-V								
THEORY								
1	UCSBS51	Business Analytics	3	3	0	0	3	100
3	UCSBS52	Compiler Design	3	3	0	0	3	100
4	UCSBS5PA	Compiler Design Lab	4	0	0	4	2	100
5		**Professional Elective Courses-II**	3	3	0	0	3	100

		Professional Elective -III	3	3	0	0	3	100
6	UCSBS5PB	Phase I Project	6	0	0	6	6	100
TOTAL			**22**	**12**	**0**	**10**	**20**	
Semester-VI								
THEORY								
1	UCSBS61	Software project management	3	3	0	0	3	100
2		**Professional Elective -IV**	3	3	0	0	3	100
3		**Professional Elective -V**	3	3	0	0	3	100
4	UCSBS6PX	Phase II project	12	0	0	12	12	100
TOTAL			**21**	**9**	**0**	**12**	**21**	

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LIST OF PROFESSIONAL ELECTIVE COURSES

Sl. No.	Course Code	Course Title	Contact Hours	L	T	P	C	Marks
Elective courses-I								
1	UCSBS46	Internet of thing (IOT)	3	3	0	0	3	100
2	UCSBS47	Intelligent Database System	3	3	0	0	3	100
3	UCSBS48	Business Environment	3	3	0	0	3	100
4	UCSBS49	Augmented Reality &Virtual Reality	3	3	0	0	3	100
5	UCSBS50	Information Retrieval And Management	3	3	0	0	3	100
Elective courses-II AND III								
1	UCSBS53	Enterprise resource planning	3	3	0	0	3	100
2	UCSBS54	Data mining using R	3	3	0	0	3	100
3	UCSBS55	Image Processing and Analysis	3	3	0	0	3	100
4	UCSBS56	Stream Processing Analytics	3	3	0	0	3	100
5	UCSBS57	Natural Language	3	3	0	0	3	100

		Processing						
6	UCSBS58	Software Quality Assurance	3	3	0	0	3	100
7	UCSBS59	Statistics For Management	3	3	0	0	3	100
8	UCSBS60	Information Management	3	3	0	0	3	100
Elective courses-IV AND V								
1	UCSBS62	International Business Management	3	3	0	0	3	100
2	UCSBS63	Social Network Analytics	3	3	0	0	3	100
3	UCSBS64	Cyber Forensic Analytics	3	3	0	0	3	100
4	UCSBS65	Energy Harvesting Technologies And Power Management For Iot Devices	3	3	0	0	3	100
5	UCSBS66	Artificial Intelligence and Expert Systems	3	3	0	0	3	100
6	UCSBS67	Web Services And Service Oriented Architecture	3	3	0	0	3	100
7	UCSBS68	Mobile and Pervasive Computing	3	3	0	0	3	100
8	UCSBS69	Image Processing and Pattern Recognition	3	3	0	0	3	100

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS01/ BUSINESS COMMUNICATION AND VALUE SCIENCE**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	2	**0**	**0**	**2**

COURSE OBJECTIVES

The course aims to augment student's overall communication and interpersonal skills by engaging them in group activities and thus aid in helping them to emerge as professionals. The English language topics for this semester focus on the development of basic fluency in English, usage of words and also introduce them to the concept and importance of interpersonal skills so as to effectively present their personalities.

COURSE OUTCOMES

1. Speak fluently in English without errors in tenses and hence present themselves as effective English communicators. They will be able to learn the 12 tenses and use them appropriately.
2. Differentiate between active and passive vocabulary and be able to use the 60 words discussed in class for their daily conversation and 40 words also given as assignments.
3. The ability to process their ideas and thoughts (verbal communication) into written communication in an effective, coherent and logical manner within a stipulated time and specific word limit of 100-150 words for paragraph writing.
4. Present them in a certain manner by using the 50-55 phrases discussed in class appropriately for group discussions, personal interviews during the campus recruitment process/competitive exams.
5. Enhance their communication skills by acquainting with the 2 important aspects of communication and helping them to overcome the 10 most common barriers of communication. Learn the 7 different types of listening skills; differentiate effective listening skills and understand the importance of it through 5 activities held in class and

implement them in professional life.

6. Understand the importance of team work, team motivation and effective team communication for further implementation in the corporate life. They should also be able to identify concretely between team and group dynamics.

UNIT – I [6 Hours]

Essential Grammar : Tenses: Basic forms and use, sentence formation (general & Technical), Common errors, Parts of speech through context, Direct and reported speech structures and voices.

Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary Phonetic: Pronunciation, Reduction of MTI in spoken English, Question formation with emphasis on common errors made during conversation

UNIT – II [6 Hours]

Written Communication : Letter Writing –Formal and Informal letter writing, Application letters, Report writing academic and business report, Job application letter

UNIT – III [6 Hours]

Communication Skills: Importance of effective communication, types of communication-verbal and non - verbal, barriers of communication, effective communication, Listening Skills: Law of nature- Importance of listening skills, Difference between listening and hearing, Types of listening.

UNIT – IV [6 Hours]

Self - Awareness & Self Development: Self - Assessment, Self - Appraisal, SWOT, Goal setting - Personal & career- Self-Assessment, Self-Awareness, Perceptions and Attitudes, Positive Attitude, Values and Belief Systems, Self-Esteem, Self - appraisal, Personal Goal setting, Career Planning, Personal success factors, Handling failure, Depression and Habit, relating SWOT analysis & goal setting, and prioritization Socio-Cultural and Cross-Cultural Sensitivities at the Workplace: What is Inclusion? Women's contributions in Industry, work issues faced by women, what is sexual harassment, what is appropriate behavior for everyone

at work

UNIT – V [6 Hours]

Interpersonal Skills : Team work, Team effectiveness, Group discussion, Decision making - Team Communication. Team, Conflict Resolution, Team Goal Setting, Team Motivation Understanding Team Development, Team Problem Solving, Building the team dynamics. Multicultural team activity

Time Management: The Time management matrix, apply the Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters, how to plan, how to handle interruptions, to maximize your personal effectiveness, how to say "no" to Time wasters

Values of a good manager: Understanding Corporate Values and behavior; Personal / Human Values; Pride and grace in Nationalist

TOTAL-30 Hours

Text Books:

1. Business Communication – Dr. Saroj Hire math
2. English vocabulary in use – Alan McCarthy and O'Dell

Reference Books

1. Strategic Writing by Charles Marsh
2. The Seven Basic Plots by Christopher Booker

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS02/ LINEAR ALGEBRA & CALCULUS**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

COURSE OUTCOMES

Upon completing this course, students will be able to:

1. Apply the Matrix Methods to solve the system of linear equations
2. Test the convergence and divergence of the infinite Series.
3. Determine the extreme values of functions of two variables.
4. Apply the vector differential operator to scalar and vector functions .
5. Solve line, surface & volume integrals by Greens, Gauss and Stoke's theorems.

UNIT-I Matrices: [12 Hours]

Rank of a matrix, Echelon form, consistency of linear System of equations, Linear dependence of vectors, Eigen values, Eigenvectors, Properties of Eigen values, Cayley-Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by linear transformation, Nature of quadratic form.

UNIT-II Infinite Series: [12 Hours]

Definition of Convergence of sequence and series. Series of positive terms –Necessary condition for convergence, Comparison tests, limit form comparison test, D'Alembert's Ratio test, Raabe's test, Cauchy's root test, alternating series, Leibnitz's rule, absolutely and conditionally convergence.

UNIT-III Partial Differentiation and Its Applications: [12 Hours]

Functions of two or more variables, Partial derivatives, Higher order partial derivatives, Total derivative, Differentiation of implicit functions, Jacobians, Taylor's expansion of functions of two variables, Maxima and minima of functions of two variables.

UNIT-IV Vector Differential Calculus: [12 Hours]

Scalar and vector point functions, vector operator Del, Gradient, Directional derivative, Divergence, Curl, Del applied twice to point functions, Del applied to product of point functions (vector identities). Applications: Irrotational fields and Solenoidal fields.

UNIT-V Vector Integral Calculus: [12 Hours]

Line integral, Surface integral and Volume integral. Green's theorem in the plane, verifications of Stroke's theorem (without proof) and Gauss's divergence theorem(without proof).

TOTAL-60 Hours

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2017.

2. Erwin kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2010.

3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, Reprint, 2017.

4. Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.

REFERENCE BOOKS

1. Sastry, S.S, —Engineering Mathema[cs", Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.

2. Wylie, R.C. and Barre\, L.C., —Advanced Engineering Mathema[cs —Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.

3. Dean G. Duffy., "Advanced Engineering Mathematics with MATLAB", CRC Press, Third Edition 2013

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS03/ DIGITAL SYSTEM DESIGN**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

- To design digital circuits using simplified Boolean functions
- To analyze and design combinational circuits
- To analyze and design synchronous and asynchronous sequential circuits
- To understand Programmable Logic Devices
- To write HDL code for combinational and sequential circuits

COURSE OUTCOMES:

1. Explain the fundamentals of number system , Codes and digital logic families
2. Develop combinational circuits.
3. Design synchronous sequential circuits using flip-flops.
4. Demonstrate Asynchronous Sequential circuits and Programmable Logic Devices.
5. Apply simulation tools for designing digital logic circuits.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES [9 Hours]

Number Systems – Arithmetic Operations – Binary Codes- Boolean Algebra and Logic Gates – Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Simplification of Boolean Functions using Karnaugh Map – Logic Gates – NAND and NOR Implementations.

UNIT II COMBINATIONAL LOGIC [9 Hours]

Combinational Circuits – Analysis and Design Procedures – Binary Adder-Subtractor – Decimal Adder – Binary Multiplier – Magnitude Comparator – Decoders – Encoders – Multiplexers – Introduction to HDL – HDL Models of Combinational circuits.

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC [9 Hours]

Sequential Circuits – Storage Elements: Latches , Flip-Flops – Analysis of Clocked Sequential

Circuits – State Reduction and Assignment – Design Procedure – Registers and Counters – HDL Models of Sequential Circuits.

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC [9 Hours]

Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.

UNIT V MEMORY AND PROGRAMMABLE LOGIC [9 Hours]

RAM – Memory Decoding – Error Detection and Correction – ROM – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices.

TOTAL-45 Hours

TEXT BOOKS:

1.M. Morris R. Mano, Michael D. Ciletti, ―Digital Design: With an Introduction to the Verilog HDL, VHDL, and SystemVerilog‖, 6th Edition, Pearson Education, 2017.

REFERENCE BOOKS:

1. G. K. Kharate, Digital Electronics, Oxford University Press, 2010

2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2017.

3. Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning, 2013

4. Donald D. Givone, Digital Principles and Design‖, Tata Mc Graw Hill, 2003.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS04/ PROBLEM SOLVING AND PROGRAMMING USING C**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

COURSE OUTCOMES:

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

1. Apply appropriate looping and conditional constructs for given problems
2. Use pointers, arrays and strings to solve complex problems
3. Use Structures, unions and files for problem solving
4. Apply problem solving techniques to real world problems
5. Make use of functions to build modular programming

UNIT I –PROBLEM SOLVING FUNDAMENTALS (9HRS)

Introduction to problem solving - Flow Chart, Algorithm, Pseudo code - Procedural Programming (Modular and Structural)- Program Compilation, Execution, Debugging, Testing – Preprocessors -Basic features of C, Structure of C program - Data types- Storage Classes-Tokens in C- Input and Output Statements inC, Operators- Bitwise, Unary, Binary and Ternary Operators, Precedence and Associativity –Expression Evaluation

UNIT II – CONDITIONAL STATEMENTS AND LOOPING CONSTRUCTS (9HRS)

Problem solving using Conditional or Selection or Branching Statements: Structure of if, if-else,

else-if ladder, nested-if, switch constructs - Looping constructs: Structure of for, while, do-while constructs, usage of break, return, go to and continue keywords

UNIT III – ARRAYS AND STRINGS (9HRS)

1D Array –Declaration, Initialization, 2DArray - Declaration, Initialization, Multi-dimensional Arrays Strings: Declaration, Initialization, String operations: length, compare, concatenate, copy

UNIT IV – FUNCTIONS AND POINTERS (9HRS)

Functions: Built-in Functions, User defined functions – Function Prototypes –Recursion – Command Line Argument -Arrays and Functions – Strings and Functions. Pointers: Declaration – Pointer operators – Pointer Arithmetic-Passing Pointers to a function-Pointers and one-dimensional arrays-Dynamic memory allocation.

UNIT V – STRUCTURES, UNION AND FILE HANDLING (9HRS)

Structure: Create a Structure-Member initialization - Accessing Structure Members - Nested structures– Pointer and Structures – Array of structures -Self Referential Structures – type def-Unions, Files –Opening and Closing a Data File, Reading and writing a data file.

TOTAL : 45 HOURS

TEXT BOOKS:

1.Jeyapoovan T, “Fundamentals of Computing and Programming in C”, Vikas Publishing house, 2015

2. Mark Siegesmund, "Embedded C Programming", first edition, Elsevier publications, 2014.

REFERENCE BOOKS

1. Ashok Kamthane, “Computer Programming”, Pearson Education, 7th Edition, Inc 2017.

2. Yashavant Kanetkar, “Let us C”, 15th edition, BPP publication, 2016.

3. S.Sathyalakshmi, S.Dinakar, “Computer Programming Practicals – Computer Lab Manual”, Dhanam Publication, First Edition, July 2013

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS05/ INTRODUCTION TO LINUX			
YEAR / SEMESTER	I / I			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

- To gain knowledge on the basic Linux commands.
- To have a hands on experience in open office
- To have clear understanding in open source softwares

COURSE OUTCOMES

Students are provided learning experiences that enable them to:

- Use Linux desktop and GNU tool chain with Eclipse IDE.
- Cross compile Linux kernel and port it to target board.
- Add applications and write customized application for the Linux kernel in the target board

UNIT I - INTRODUCTION TO LINUX 9HRS

What Is Linux? -The Problems with Windows -The Benefits of Linux - Proprietary Software and the GPL- GNU and Linux Together- Different Flavors of Linux- Who Uses Linux?- Understanding How Linux Differs from Windows- Using Ubuntu

UNIT II BASH SHELL 9HRS

What Is the BASH Shell? -Working with Files-Listing Files-Copying Files and Directories - Moving Files and Directories -Deleting Files and Directories -Changing and Creating Directories-Real Files and Virtual Files. -Users and File Permissions - The File System Explained -File Searches -Using the find Command -Using the locate Command -Using the whereis Command-File Size and Free Space -Viewing File Sizes -Finding Out the Amount of Free Space.

UNIT III INITIALIZATION 9HRS

Linux kernel and kernel initialization - system initialization – hardware support - boot loaders.

UNIT IV DEVICE HANDLING 9HRS

Device driver basics - module utilities - file systems - MTD subsystems – busybox.

UNIT V DEVELOPMENT TOOLS 9HRS

Embedded development environment - GNU debugger - tracing & profiling tools - binary utilities - kernel debugging - debugging embedded Linux applications - porting Linux - Linux and real time - SDRAM interface.

TOTAL HOURS – 45

TEXT BOOKS:

1. Keir Thomas and Andy Channelle with Jaime Sicam (2009), “Beginning Ubuntu

2. Karim Yaghmour, Jon Masters, Gillad Ben Yossef, Philippe Gerum, “Building embedded Linux systems”, O'Reilly, 2008.

REFERENCES:

1. Christopher Hallinan, “Embedded Linux Primer: A practical real world approach”, Prentice Hall, 2007.

2. Craig Hollabaugh, “Embedded Linux: Hardware, software and Interfacing”, Pearson Education, 2002.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS1PA / PROBLEM SOLVING USING C LABORATORY**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

Course Objectives:

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

COURSE OUTCOMES:

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

- Solve problems using data types and operators
- Apply appropriate looping and conditional constructs for given C programs
- Use functions to build modular programs
- Use appropriate IDE and tools to write, compile, debug and execute a C Program
- Implement structures, unions and File Operations

LIST OF EXPERIMENTS:

1. Problem solving design using Scratch tool
2. Conditional Statements- if-if else-else if ladder- nested if- switch
3. Looping Constructs – for – while- do-while
4. One dimensional Arrays
5. Two dimensional Arrays
6. Functions- Modular Programming
7. Pointers and arrays
8. Dynamic Memory Allocation
9. Programs to illustrate File operations

10. Structures and Union

TOTAL : 60 Hours

TEXT BOOKS:

1. Kernighan B. W. and Ritchie D. M., "C Programming Language (ANSI C)", Prentice Hall of IndiaPrivate Limited, New Delhi, 2015.

2. Herbert Schildt, "C – The Complete Reference", Tata McGraw Hill Publishing Company, NewDelhi, 2017.

REFERENCE BOOKS:

1. Deitel and Deitel, "C How to Program", Pearson Education, New Delhi, 2011.

2.Byron S. Gottfried and Jitendar Kumar Chhabra, "Programming with C", Tata McGraw Hill Publishing Company,New Delhi,2011

3. PradipDey and ManasGhosh, "Programming in C", Oxford University Press, New Delhi, 2009.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS1PB / LINUX LAB**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES:

The main objective of this course is to

- Learn and get familiar with the Unix operating system through Red hat Linux.
- UNIX basic commands working and their purpose will be defined

COURSE OUTCOMES:

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

- To use Linux desktop and GNU tool chain with Eclipse IDE.
- Cross compile Linux kernel and port it to target board.
- Add applications and write customized application for the Linux kernel in the target board.

LIST OF EXPERIMENTS:

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir

2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)

3. Write C programs to simulate UNIX commands like ls, grep, etc.

4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.

5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies,

6. compute and print the average waiting time and average turnaround time.

TOTAL : 60 Hours

TEXT BOOKS:

1. The Design of Unix Operating System, Maurice J. Bach, Pearson Education, 2010

REFERENCE BOOKS:

1. Advance UNIX, a Programmer's Guide, S. Prata, BPB Publications, and New Delhi, 2011

2. Unix Concepts and Applications, Sumitabh Das, 2010

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS1PC/ COMMUNICATIVE SKILLS AND LANGUAGE LABORATORY**			
YEAR / SEMESTER	**I / I**			
	L	**T**	**P**	**C**
	0	**0**	**2**	**1**

COURSE OBJECTIVES:

This course will introduce the students:

1. To nuances of Phonetics and give them sufficient practice in correct pronunciation.
2. To word stress and intonation.
3. To IELTS and TOEFL material for honing their listening skills.
4. To activities enabling them overcome their inhibitions while speaking in English with the focus being on fluency rather than accuracy.
5. To team work, role behaviour while developing their ability to discuss in groups and making oral presentations.

COURSE OUTCOMES:

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

1. Define the speech sounds in English and understand the nuances of pronunciation in English
2. Apply stress correctly and speak with the proper tone, intonation and rhythm.
3. Analyze IELTS and TOEFL listening comprehension texts to enhance their listening skills.
4. Determine the context and speak appropriately in various situations.
5. Design and present effective posters while working in teams, and discuss and participate in Group discussions.

LIST OF EXERCISES:

1. **Introduction to English Phonetics**: Introduction to auditory, acoustic and articulatory phonetics,organs of speech: the respiratory, articulatory and phonatory systems.
2. **Sound system of English**: Phonetic sounds and phonemic sounds, introduction to international phonetic alphabet, classification and description of English phonemic sounds,

minimal pairs. The syllable: types of syllables, consonant clusters.

3. **Word stress**: Primary stress, secondary stress, functional stress, rules of word stress.

4. **Rhythm &Intonation:** Introduction to Rhythm and Intonation. Major patterns, intonation of English with the semantic implications.

5. **Listening skills** – Practice with IELTS and TOEFL material

6. **Public speaking –** Speaking with confidence and clarity in different contexts on various issues.

7. **Group Discussions -** Dynamics of a group discussion, group discussion techniques, body language.

8. **Pictionary –** weaving an imaginative story around a given picture.

9. **Information Gap Activity –** Writing a brief report on a newspaper headline by building on the hints given

10. **Poster presentation –** Theme, poster preparation, team work and presentation.

TOTAL : 30 Hours

REFERENCE BOOKS:

1. T Balasubramanian. A Textbook of English Phonetics for Indian Students, Macmillan, 2017.

2. J Sethi et al. A Practical Course in English Pronunciation (with CD), Prentice Hall India, 2013 .

3. Priyadarshi Patnaik. Group Discussions and Interviews, Cambridge University Press Pvt. Ltd.,2011

4. ArunaKoneru, Professional Speaking Skills, Oxford University Press, 2016

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SEMESTER-II

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS21/ PROBABILITY AND STATISTICS**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

COURSE OBJECTIVES

To impart knowledge about the basic concepts of probability in solving application oriented problems To provide an understanding on the concepts of statistics

COURSE OUTCOMES

On completion of the course the students will be able to

1. solve basic problems in probability and fundamentals of statistics.
2. solve problems using standard probability distributions.
3. find the marginal and conditional distributions of two dimensional random variables.
4. calculate rank correlation and fitting curves for the given data.
5. use method of moments and moment generating functions.

UNIT I RANDOM VARIABLES AND DISTRIBUTION FUNCTIONS (12 HRS)

Discrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

UNIT II MOMENTS AND MOMENT GENERATING FUNCTIONS (12 HRS)

Expectation of a random variable – probability generating function – properties - moment generating function.

UNIT III TWO DIMENSIONAL RANDOM VARIABLES (12HRS)

Joint, marginal and conditional distribution functions - independence of random variables.

UNIT IV DESCRIPTIVE STATISTICS (12HRS)

Types of data - primary and secondary data - classification and representation of data - formation of frequency distribution - various measures of central tendency, dispersion - and their merits and demerits - concept of skewness and kurtosis.

UNIT V CORRELATION AND CURVE FITTING (12 HRS)

Correlation coefficient and regression - rank correlation - curve fitting by least square methods - fitting a straight line, parabola, power curve and exponential curves. (no derivation, numerical problems only)

TOTAL HOURS – 60

TEXT BOOKS:

1. Richard Arnold Johnson, Irwin Miller, John E. Freund , Miller & Freund's

2. Probability and Statistics for Engineers, Prentice Hall, 2011.

3. Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.

4. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.

REFERENCES:

1. Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.

2. Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.

3. Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.

4. Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974. 5. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS22/ DATABASE MANAGEMENT SYSTEMS			
YEAR / SEMESTER	I / II			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

- Provide an introduction to the management of database systems.
- Understand the fundamentals of relational systems including data models,database architectures, and database manipulations.

COURSE OUTCOMES

At the conclusion of the course, the student will be able to:

1. Understand terms related to database design and management.
2. Understand the objectives of data and information management.
3. Develop physical data models for relational database management systems.
4. Implement relational databases using a RDBMS retrieve data using SQL.

UNIT I INTRODUCTION 9HRS

Database Systems vs. File Systems - View of Data - Data Models- Database Languages - Transaction Management - Database Systems Structure - History of Database Systems - Database Systems Applications - Entity Relationship Model.

UNIT II RELATIONAL DATABASES 9HRS

SQL - Basic Structure - Set Operations - Complex Queries - Joined Queries - DDLEmbedded SQL-Dynamic SQL-Other SQL Functions-Query by Example- Integrity and Security of searching-Relational Database Design.

UNIT III DATA STORAGE AND INDEXING 9HRS

Storage & File Structure - Disks-RAID-File Organization - Indexing &Hashing- B+ TREE-B Tree-Static Hashing-Dynamic Hashing-Multiple Key Access.

UNIT IV QUERY EVALUATION & OPTIMIZATION 9HRS

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions

UNIT V QUERY OPTIMIZATION 9HRS

Query Optimization Overview - Transformation of Relational Expressions -Estimating Statistics of Expression Results - Choice of Evaluation Plans

TOTAL-45 HOURS

TEXT BOOK:

1. Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison-Wesley, 2011

REFERENCES:

1. Raghu Ramakrishnan & Johannesgerhrke, “Data Base Management Systems”, Mc Graw Hill International Edition, 2000.

2. C.J. Date, A. Kannan, S. Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS23/ OOPS WITH C++**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

The aim of the course is to

- Understand the concepts of classes and object
- Define classes for a given situation and instantiate objects for specific problem solving.
- Reuse available classes after modifications if possible
- Possess skill in object oriented thought process

COURSE OUTCOMES

After completion of this course, the students would be able to

- Understand concepts of objects and their significance in real world
- Learn to co-relate relationship among different entities involved in a system
- Develop software in terms of objects, associations, and integrity constraints
- Identify, understand and analyze various sample development models
- Design classes and inheritances
- Real life problem formulation in terms of objects and classes
- Data handling through files

UNIT I INTRODUCTION TO OBJECT ORIENTED PROGRAMMING 9HRS

Concept of Object orientation – comparison with procedural and structured programming – Classes and objects – data Abstraction, encapsulation, dynamic binding, message passing. Advantages of object orientation -Basic data types and declarations.

UNIT II CLASSES AND OBJECTS 9HRS

Classes and objects in C++, access modifiers, static members, friend functions, Constructors and Destructors, polymorphism, Operator Overloading and type conversion

UNIT III INHERITANCE 9HRS

Inheritance - parent and child classes, private, public and protected inheritance, multiple

inheritances and multi-level inheritance, Virtual base classes. new and delete operators, objects.

UNIT IV POLYMORPHISM AND EXCEPTION HANDLING 9HRS

Binding & Polymorphism: Early binding, Late Binding, Pointers to derived class objects, virtual functions, Pure virtual functions, exception handling in C++: try, throw and catch.

UNIT V FILE STREAM CLASSES AND TEMPLATES 9HRS

Study of File stream classes in C++. Templates – class and function templates, Templates versus macros, String objects in C++, Standard Template Library in C++ .

TOTAL-45 HOURS

TEXT BOOKS:

1. Bjarne Stroustrup, " Programming: Principles and Practice Using C++ ", Addison Wesley, 2nd edition, ISBN-13: 978-0321992789, 2014.

REFERENCES:

1. Bjarne Stroustrup," The C++ Programming Language", Addison Wesley, 4 th edition, ISBN-13: 978-0321563842, 2013.

2. Herbert Schildt, "C++ The Complete Reference", Tata McGraw Hill fourth Edition, 2003

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS24/ PRINCIPLES OF MANAGEMENT**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

- To study the Evolution of Management
- To study the functions and principles of management
- To learn the application of the principles in an organization

COURSE OUTCOMES

Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9HRS

Definition of Management –Science or Art – Manager Vs Entrepreneur- types of managers managerial roles and skills – Evolution of Management –Scientific, human relations , system and contingency approaches– Types of Business organization- Sole proprietorship, partnership, company-public and private sector enterprises- Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING 9HRS

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III ORGANISING 9HRS

Nature and purpose – Formal and informal organization – organization chart–organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization –Job Design - Human Resource Management –HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

UNIT IV DIRECTING 9HRS

Foundations of individual and group behaviour– motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership –communication – process of communication – barrier in communication – effective communication –communication and IT.

UNIT V CONTROLLING 9HRS

System and process of controlling –budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Stephen P. Robbins & Mary Coulter, " Management", Prentice Hall (India)Pvt. Ltd., 10th Edition, 2009.

2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.

2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.

3. Harold Koontz & Heinz Weihrich "Essentials of management" Tata McGraw Hill,1998.

4. Tripathy PC & Reddy PN, "Principles of Management", Tata Mcgraw Hill, 1999

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS25/ COMPUTER ORGANIZATION & ARCHITECTURE**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

Identify the functional units in a digital computer system, distinguish between the various ISA styles, trace the execution sequence of an instruction through the processor, compare different approaches used for implementing a functional unit and evaluate different computer systems based on performance metrics

COURSE OUTCOMES

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

1. Identify various components of computer and their interconnection
2. Identify basic components and design of the CPU: the ALU and control unit.
3. Compare and select various Memory devices as per requirement.
4. Compare various types of IO mapping techniques
5. Critique the performance issues of cache memory and virtual memory

UNIT I FUNDAMENTALS OF A COMPUTER SYSTEM 9HRS

Functional Units of a Digital Computer – Hardware – Software Interface –Translation from a High Level Language to the Hardware Language – Instruction Set Architecture – Styles and features – RISC and CISC Architectures – Performance Metrics – Amdahl's Law – Case Studies of ISA.

UNIT II BASIC PROCESSING UNIT 9HRS

Components of the Processor – Datapath and Control – Execution of a Complete Instruction – Hardwired and Micro programmed Control – Instruction Level Parallelism – Basic Concepts of Pipelining – Pipelined Implementation of Datapath and Control – Hazards – Structural, Data and Control Hazards –Exception handling.

UNIT III ADVANCED CONCEPTS IN ILP AND CURRENT TRENDS 9HRS

Exploitation of more ILP – Hardware and Software Approaches – Dynamic Scheduling – Speculation – Compiler Approaches – Multiple Issue Processors. – ILP and Thread Level Parallelism – Current Trends – Multicore Processors – Graphics and Computing GPUs.

UNIT IV ARITHMETIC FOR COMPUTERS 9HRS

Addition and Subtraction – Fast Adders – Binary Multiplication – Binary Division – Floating Point Numbers – Representation, Arithmetic Operations.

UNIT V MEMORY AND I/O 9HRS

Need for a hierarchical memory system – Types and characteristics of memories – Cache memories – Improving cache performance – Virtual memory – Memory management techniques – Associative memories. Accessing I/O devices – Programmed Input/Output – Interrupts – Direct Memory Access – Interface circuits – Need for Standard I/O Interfaces like PCI, SCSI, USB.

TOTAL: 45 Periods

TEXT BOOK:

1. David A. Patterson and John L. Hennessy, "Computer Organization and Design: TheHardware/Software Interface", Fourth Edition, Morgan Kaufmann / Elsevier, 2009.

REFERENCES:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw Hill, 2012.

2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.

3. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.

4. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS26/ ENVIRONMENTAL SCIENCE			
YEAR / SEMESTER	I / II			
	L	T	P	C
	2	0	0	2

COURSE OBJECTIVES

- To study the nature and facts about environment.
- For finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- For appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth‟s interior andsurface.
- To study the integrated themes and biodiversity, natural resources, pollution control andwaste management.

COURSE OUTCOMES

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 6HRS

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers

– energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 6HRS

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 6HRS

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of

resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 6HRS

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6HRS

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL-30 HOURS

TEXTBOOKS:

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition,Pearson Education, 2004.

REFERENCES :

1. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India Pvt Ltd, New Delhi, 2007.

2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press(I) Pvt, Ltd, Hydrabad, 2015.

3. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India

PVT, LTD, Delhi, 2014.

4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS2PA / OOPS WITH C++ LAB**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

- Understand and solve logical & mathematical problems through C++ language
- Strengthen knowledge of a procedural programming language.
- Design and develop solutions to intermediate level problems
- Develop their skills in software development using a procedural language
- Get programming in skill the object oriented technology with the usage of C++.

COURSE OUTCOMES

After completion of this course, the students would be able to

- Create classes and objects in C++
- Implement inheritance, polymorphism and object relationship in C++
- Design methods and procedure Manipulate data through file in C++
- Debug and test software.
- Develop a minor software in C++ language

LIST OF PROGRAMS

1. Creation of classes and use of different types of functions.
2. Programs using Constructor and Destructor
3. Count the number of objects created for a class using static member function.
4. Write programs using function overloading and operator overloading.
5. Programs using inheritance.
6. Program using friend functions.
7. Program using virtual function.
8. Program using exception handling mechanism.
9. Programs using files.
10. Programs using function templates.

TOTAL-60 HOURS

TEXT BOOKS

1. Bjarne Stroustrup, " Programming: Principles and Practice Using C++ ", Addison Wesley, 2nd edition, ISBN-13: 978-0321992789, 2014.

REFERENCES:

1. Bjarne Stroustrup," The C++ Programming Language", Addison Wesley, 4 th edition, ISBN-13: 978-0321563842, 2013.

2. Herbert Schildt, "C++ The Complete Reference", Tata McGraw Hill Edition, 2003

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS2PB / DATABASE MANAGEMENT SYSTEMS LAB**			
YEAR / SEMESTER	**I / II**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

The aim of the course is

- To learn SQL (Structured Query Language) which would provide functionality
- To learn how to create tables which are fundamental storage blocks of data.
- To learn how to place constraints on data that is entered on tables to ensure data integrity.
- To learn how to add, change and remove data from tables.
- To learn how to select a subset of the data you want to see from the collection of tables and data.
- To learn how to combine table and group multiple rows of data in table.
- To learn PL/SQL which would provide the ability to do iterative programming at database level to: to write programming blocks with conditional structure, assignment structure,loop structure, etc. use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc

COURSE OUTCOMES

At the end of this course, a student will be able to

• Use in real time business activities.

• create and do manipulation on database in any domain.

• work with table by using PL/SQL Program.

• get a clear idea about database transaction activities

LIST OF PROGRAMS

1. Execute a single line and group functions for a table.

2. Execute DCL and TCL Commands.

3. Create and manipulate various DB objects for a table.

4. Create views, partitions and locks for a particular DB.

5.Write PL/SQL procedure for an application using exception handling.

6. Write PL/SQL procedure for an application using cursors.

7. Write a DBMS program to prepare reports for an application using functions.

8.Write a PL/SQL block for transaction operations of a typical application using package.

9. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD). Typical Applications – Banking, Electricity Billing, Library Operation)

TOTAL HOURS –60

TEXTBOOK:

1.Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2008.

REFERENCES:

1.Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition, Tata Mc Graw Hill, 2011.

2. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

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SEMESTER-III

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS31/ DISCRETE MATHEMATICS**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	4	**0**	**0**	**4**

COURSE OBJECTIVES

The objective of this course is to:

1. develop a foundation of set theory concepts and notation
2. explore a variety of various mathematical structures by focusing on mathematical objects, operations, and resulting properties
3. develop formal logical reasoning techniques and notation
4. demonstrate the application of logic to analyzing and writing proofs
5. develop techniques for counting, permutations and combinations
6. develop the concept of relation through various representations (digraphs, matrices, lists).

COURSE OUTCOMES

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

1. construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases
2. construct mathematical arguments using logical connectives and quantifiers and verify the correctness of an argument using propositional and predicate logic and truth tables.
3. demonstrate the ability to solve problems using counting techniques and combinatory in the context of discrete probability.
4. solve problems involving recurrence relations and generating functions.
5. perform operations on discrete structures such as sets, functions, relations and sequence

Unit I: Set Theory [12 Hours]

Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets. Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations. Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions, Growth of Functions, Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases. Proof Methods, Proof by counter – example, Proof by contradiction.

Unit II: Algebraic Structures [12 Hours]

Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields, Integers Modulo n.

Unit III: Partial order sets [12 Hours]

Definition, Partial order sets, Combination of partial order sets, Hasse diagram. Lattices: Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice. Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra.

Unit IV: Propositional Logic [12Hours]

Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference Predicate Logic: First order predicate, well-formed formula of predicate, quantifiers, Inference theory of predicate logic.

Unit V: Trees [12 Hours]

Definition, Binary tree, Binary tree traversal, Binary search tree. Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences. Combinatory, Introduction, Counting Techniques, Pigeonhole Principle

Total Hours-60

TEXT BOOKS

1. Elements of Distcrete Mathematics – Liu and Mohapatra, McGraw Hill Publications

2. Discrete Mathematical Structures – B. Kolman, R.C. Busby, and S.C. Ross, PHI Publications

REFERENCE BOOKS

1. Discrete Mathematical Structures with Application to Computer Science – Jean Paul Trembley and R Manohar, McGraw-Hill Publications

2. Discrete and Combinatorial Mathematics – R.P. Grimaldi, Addison Wesley

3. Discrete Mathematics and Its Applications – Kenneth H. Rosen, McGraw-Hill

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS32/ JAVA AND INTERNET PROGRAMMING**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

This course comprehends the concepts of core java and working principles of Internet, and the knowledge will be enhanced to the client and server side programming and web development

COURSE OUTCOMES

- Demonstrate web applications using Hypertext Markup Language, Cascading style sheets and Java Database Connectivity.
- Explain about the java networking technologies and working of struts framework.
- Develop applications using hibernate framework and Hypertext Markup Language Protocols.
- Design web applications in PHP (Hypertext Preprocessing) and to present data in XMLformat.
- Illustrate Rich Internet Application using AJAX and web services

UNIT I JAVA PROGRAMMING 9HRS

An overview of Java – Data Types – Variables and Arrays – Operators – Control Statements – Classes – Objects – Methods – Inheritance - Packages – Abstract classes – Interfaces and Inner classes – Exception handling - Introduction to Threads – Multithreading – String handling – Streams and I/O – Applets.

UNIT II WEBSITES BASICS, HTML 5, CSS 3, WEB 2.0 8 Web 2.0 9HRS

Basics-RIA Rich Internet Applications - Collaborations tools - Understanding websites and web servers: Understanding Internet – Difference between websites and web server- Internet technologies Overview –Understanding the difference between internet and intranet; HTML and CSS: HTML 5.0 , XHTML, CSS 3.

UNIT II I CLIENT SIDE AND SERVER SIDE PROGRAMMING

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,-Regular

Expressions- Exception Handling-Validation-Built-in objects-Event Handling- DHTML with JavaScript. Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server;- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages-JSP Standard Tag Library(JSTL)-Creating HTML forms by embedding JSP code.

UNIT IV PHP and XML 9HRS

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions-Connecting to Database – Using Cookies-Regular Expressions; XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT V INTRODUCTION TO AJAX and WEB SERVICES 9HRS

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application – SOAP.

TOTAL : 45 Periods

TEXT BOOKS:

1. Herbert Schildt, “Java The Complete Reference”, 8th Edition, McGraw-Hill Osborne Media, 2011.

2. Paul Deitel, “Internet & World Wide Web: How to Program”, Prentice Hall, 4th Edition, 2007. **REFERENCES:**

1. Cay S. Horstmann and Gary Cornell, “Core Java™, Volume I – Fundamentals” 8th Edition, Prentice Hall, 2007.

2. Cay S. Horstmann and Gary Cornell, “Core Java, Vol. 2: Advanced Features”, 8th Edition, Prentice Hall, 2008.

3. Robert W. Sebesta, “Programming the World Wide Web”, Addison-Wesley,Sixth Edition, 2010.

4. Elliotte Rusty Harold, “Java Network Programming”, Third Edition, O’Reilly,2004.

5. Uttam K.Roy, "Web Technologies", Oxford University Press, 1st Edition, 2010. Leon Shklar and Rich Rosen, "Web Application Architecture: Principles,

6. Protocols and Practices", Wiley, 2nd Edition, 2009. http://www.w3schools.com/

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ACADEMY OF MARITIME EDUCATION AND TRAINING
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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS33/ OPERATING SYSTEMS**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Characterize the basic functions of operating systems.
- Design the concepts of process management
- Implement the concepts of deadlocks
- Describe virtual memory and file system
- Analyze the File system implementation and disk I/O technique

UNIT 1 - INTRODUCTION (9HRS)

Introduction - Computer System Organization - Computer System Architecture - Computer System Structure - Operating System Operations - Process Management - Memory Management - Storage Management - Distributed Systems - Operating System Services - User Operating System Interface - System Calls - Types of System calls - System Programs - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication

UNIT 2 - SCHEDULING (9HRS)

Threads - Overview - Multithreading Models - CPU Scheduling - Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Thread Scheduling - Multiple-Processor Scheduling - The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Semaphores

UNIT 3 - DEADLOCKS (9HRS)

System Model - Deadlock Characterization - Methods for handling Deadlocks - Deadlock Prevention- Deadlock avoidance- Deadlock detection-Recovery from Deadlock Storage Management - Swapping- Contiguous Memory allocation

UNIT 4 - PAGING ANDFILE SYSTEM (9HRS)

Paging- Demand Paging - Copy-on Write - Page Replacement - Allocation of frames – Thrashing- Virtual Memory -File Concept - Access Methods - Directory and Disk Structure

UNIT 5 - FILE MANAGEMENT (9HRS)

File System Structure - File System Implementation - Directory Implementation - Allocation Methods - Free-space Management – Disk Structure – Disk Attachment - Disk Scheduling Disk Management - Swap-Space Management - RAID Structure

TOTAL: 45 Hours

TEXT BOOKS

1.Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Eighth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2009.

REFERENCE BOOKS

1. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education, 2002.

2. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.

3.Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India, 2003.

E-BOOKS

1.http://www.freebookcentre.net/CompuScience/Free-Operating-Systems-Books-Download.html

MOOC

1. https://www.coursera.org/learn/web-applications-php COURSE TITLE COMPUTER NET

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS34/ MACHINE LEARNING**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

The objective of this course is to provide introduction to the principles and design of machine learning algorithms. The course is aimed at providing foundations for conceptual aspects of machine learning algorithms along with their applications to solve real world problems.

COURSE OUTCOMES:

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

1. Identify various machine learning algorithms and terminologies and perform data pre-processing using standard ML library.
2. Design a predictive model using appropriate supervised learning algorithms to solve any given problem.
3. Develop an application using appropriate unsupervised learning algorithms for performing clustering and dimensionality reduction.
4. Solve complex problems using artificial neural networks and kernel machines.
5. Implement probabilistic graphical models for suitable applications.

UNIT-I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (9HRS)

Fundamentals Of Neural Networks – Model of Artificial Neuron – Neural Network Architectures – Learning Methods – Taxonomy Of Neural Network Architectures – Applications

UNIT II FEED FORWARD NEURAL NETWORKS (9HRS)

Perceptron Models: Discrete, Continuous and Multi-Category –Training Algorithms: Discrete and Continuous Perceptron Networks – Limitations of the Perceptron – Model. Credit Assignment Problem – Generalized Delta Rule, Derivation of Back propagation (BP) Training, and Summary of Back propagation Algorithm –Kolmogorov Theorem

UNIT III: MACHINE LEARNING(9HRS)

Machine Learning Fundamentals –Types of Machine Learning - Supervised, Unsupervised, Reinforcement- The Machine Learning process. Terminologies in ML- Testing ML algorithms: Overfitting, Training, Testing and Validation Sets- Confusion matrix -Accuracy metrics- ROC Curve- Basic Statistics: Averages, Variance and Covariance, The Gaussian- The Bias-Variance trade off- Applications of Machine Learning.

UNIT IV: SUPERVISED LEARNING(9HRS)

Regression: Linear Regression – Multivariate Regression- Classification: Linear Discriminant Analysis, Logistic Regression- K-Nearest Neighbor classifier. Decision Tree based methods for classification and Regression- Ensemble methods.

UNIT V: UNSUPERVISED LEARNING(9HRS)

Clustering- K-Means clustering, Hierarchical clustering - The Curse of Dimensionality - Dimensionality Reduction - Principal Component Analysis - Probabilistic PCA- Independent Components analysis

TOTAL: 45 Hours

TEXT BOOKS

1. CharuC.Aggarwal "Neural Networks and Deep learning" Springer International Publishing, 2018

2. Satish Kumar, "Neural Networks, A Classroom Approach", Tata McGraw -Hill, 2007.

3.Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.

4..Stephen Marsland, "Machine Learning –An Algorithmic Perspective", CRC Press, 2009.

5.Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, "Machine Learning", Pearson Education, 2018.

6.Christopher Bishop, "Pattern Recognition and Machine Learning" Springer, 2011.

REFERENCE BOOKS

1.Andreas C. Muller, "Introduction to Machine Learning with Python: A Guide for Data Scientists", O'Reilly,2016.

2.Sebastian Raschka, "Python Machine Learning", Packt Publishing, 2015.

3.Hastie, Tibshirani, Friedman, "The Elements of Statistical Learning: Data Mining, Inference, and Prediction**"**,2nd Edition, Springer, 2017.

4.Ethem Alpaydin, "Introduction to Machine Learning", 2nd Revised edition, MIT Press,2010.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS35 / DATA COMMUNICATION AND NETWORKING**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

The student should be made to:

Understand the division of network functionalities into layers.

Be familiar with the components required to build different types of networks

Be exposed to the required functionality at each layer

Learn the flow control and congestion control algorithms

COURSE OUTCOMES

- To Focus on different coding schemes.
- To Introduce flow of data, categories of network, different topologies.
- To Focus on information sharing and networks.
- Brief the students regarding protocols and standards.
- To give clear idea of signals, transmission media, errors in data communications and their correction, networks classes and devices,etc.

UNIT I FUNDAMENTALS & LINK LAYER 9HRS

Overview of Data Communications- Networks – Building Network and its types– Overview of Internet – Protocol Layering -OSI Mode – Physical Layer – Overview of Data and Signals - introduction to Data Link Layer – Link layer Addressing-Error Detection and Correction

UNIT II MEDIA ACCESS & INTERNETWORKING 9HRS

Overview of Data link Control and Media access control – Ethernet (802.3) – Wireless LANs –Available Protocols – Bluetooth – Bluetooth Low Energy – WiFi – 6LowPAN–Zigbee – Network layer services – Packet Switching – IPV4 Address – Network layer protocols (IP, ICMP, Mobile IP)

UNIT III ROUTING 9HRS

Routing – Unicast Routing – Algorithms – Protocols –Multicast Routing and its basics – Overview of Intradomain and interdomain protocols –Overview of IPv6 Addressing – Transition from IPv4 to IPv6

UNIT IV TRANSPORT LAYER 9HRS

Introduction to Transport layer –Protocols- User Datagram Protocols (UDP) and Transmission Control Protocols (TCP) –Services – Features – TCP Connection – State Transition Diagram – Flow, Error and Congestion Control – Congestion avoidance (DECbit, RED) – QoS – Application requirements

UNIT V APPLICATION LAYER 9HRS

Application Layer Paradigms – Client Server Programming – World Wide Web and HTTP – DNS-Electronic Mail (SMTP, POP3, IMAP, MIME) – Introduction to Peer to Peer Networks – Need for Cryptography and Network Security – Firewalls.

Total- 45 hours

TEXT BOOK:

1. Behrouz A. Forouzan, ―Data communication and Networking‖, Fifth Edition, Tata McGraw – Hill, 2013 (UNIT I –V)

REFERENCES

1. James F. Kurose, Keith W. Ross, ―Computer Networking - A Top-Down Approach Featuring the Internet‖, Seventh Edition, Pearson Education, 2016.

2. Nader. F. Mir,― Computer and Communication Networks‖, Pearson Prentice Hall Publishers, 2nd Edition, 2014.

3. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, ―Computer Networks: An Open Source Approach‖, Mc Graw Hill Publisher, 2011.

4. Larry L. Peterson, Bruce S. Davie, ―Computer Networks: A Systems Approach‖, Fifth Edition, Morgan Kaufmann Publishers, 2011.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS36/ DESIGN AND ANALYSIS OF ALGORITHMS**			
YEAR / SEMESTER	**II/ III**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To understand and apply the algorithm analysis techniques.

To critically analyze the efficiency of alternative algorithmic solutions for the same problem

To understand different algorithm design techniques.

To understand the limitations of Algorithmic power.

COURSE OUTCOMES

1. Analyze the asymptotic performance of algorithms.
2. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3. Find optimal solution by applying various methods.
4. Apply pattern matching algorithms to find particular pattern.
5. Differentiate polynomial and nonpolynomial problems.
6. Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate.

UNIT I INTRODUCTION (9HRS)

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types– Fundamentals of the Analysis of Algorithmic Efficiency –Asymptotic Notations and their properties. Analysis Framework – Empirical analysis – Mathematical analysis for Recursive and Non-recursive algorithms – Visualization

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER (9HRS)

Brute Force – Computing an– String Matching – Closest-Pair and Convex-Hull Problems - Exhaustive Search – Travelling Salesman Problem – Knapsack Problem – Assignment problem.Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort – Heap Sort -Multiplication of Large Integers – Closest-Pair and Convex – Hull Problems.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE (9HRS)

Dynamic programming – Principle of optimality – Coin changing problem, Computing a Binomial Coefficient – Floyd's algorithm – Multi stage graph – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique – Container loading problem – Prim's algorithm and Kruskal's Algorithm – 0/1 Knapsack problem, Optimal Merge pattern – Huffman Trees.

UNIT IV ITERATIVE IMPROVEMENT (9HRS)

The Simplex Method – The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs, Stable marriage Problem.

UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER (9HRS)

Lower – Bound Arguments – P, NP NP- Complete and NP Hard Problems. Backtracking – n-Queenproblem – Hamiltonian Circuit Problem – Subset Sum Problem. Branch and Bound – LIFO Searchand FIFO search – Assignment problem – Knapsack Problem – Travelling Salesman Problem –Approximation Algorithms for NP-Hard Problems – Travelling Salesman problem – Knapsack problem.

Total Hours-45

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam,Galgotia publications pvt. Ltd.

2. Design and Analysis Algorithms - Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson

3. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.

REFERENCE BOOKS:

1. Introduction to Algorithms, secondedition,T.H.Cormen,C.E.Leiserson, R.L.Rivest,and C.Stein,PHI Pvt. Ltd./ Pearson Education

2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.

3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS3PA / JAVA AND INTERNET PROGRAMMING LABORATORY**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

- Develop the programming skills using the object oriented programming methodology to produce quality computer based solutions to real problems
- Utilize the advance features of Java technology.
- Work with collection API and develop fast programs.
- Develop good multithreaded programs

COURSE OUTCOMES

After completion of this course, the students would be able to

- Understand Java and object-oriented programming language concepts.
- Write, debug, and document well-structured Java applications Implement Java classes from specifications
- Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
- Implement interfaces, inheritance, and polymorphism as programming techniques

LIST OF EXPERIMENTS

1.Create a web page with the following using HTML

i) To embed an image map in a web page ii) To fix the hot spots iii) Show all the related information when the hot spots are clicked.

2. Create a web page with all types of Cascading style sheets. 3. Client Side Scripts for Validating Web Form Controls using DHTML

4. Write programs in Java to create applets incorporating the following features:

5. Create a color palette with matrix of buttons Set background and foreground of the control

text area by selecting a color from color palette. In order to select Foreground or background use check box control as radio buttons To set background images

6. Write programs in Java using Servlets: To invoke servlets from HTML forms To invoke servlets from Applets

7. Write programs in Java to create three-tier applications using JSP and Databases for conducting on-line examination for displaying student mark list. Assume that student information is available in database which has been stored in a database server.

8. Programs using XML – Schema – XSLT/XSL

9. Programs using AJAX 10. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.

. **JAVA PROGRAMMING**

Programs using basic data types, operators and control structures. 2. Class definitions and usage involving variety of constructors and finalizes 3. Programs involving various kinds of inheritances, 4. Program to demonstrate creation and handling of packages, their imports and Class Path. 5. Programs involving a variety of Exception Handling situations 6. Program involving creating and handling threads in applications and applets. 7. Program to demonstrate AWT/Swing graphic methods 8. Program for Loading and Viewing Images, Loading and Playing Sound

TOTAL HOURS-60

TEXT BOOKS:

1. Patrick Naughton, "Complete Reference: JAVA 2", 8th Edition, Tata McGrawHill, 2011.

REFERENCES:

1. Keyur shah, “Gateway to Java Programmer Sun Certification”, Tata McGraw Hill 2002.

2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2007

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS3PB/ MACHINE LEARNING LAB**			
YEAR / SEMESTER	**II / III**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

•Make use of Data sets in implementing the machine learning algorithms

•Implement the machine learning concepts and algorithms in any suitable language of choice.

COURSE OUTCOMES

The students should be able to:

1. Understand the implementation procedures for the machine learning algorithms.
2. Design Java/Python programs for various Learning algorithms.
3. Applyappropriate data sets to the Machine Learning algorithms.
4. Identify and apply Machine Learning algorithms to solve real world problems

LIST OF EXPERIMENTS

1. Implement and demonstratethe FIND-Salgorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithmto output a description of the set of all hypotheses consistent with the training examples.
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge toclassify a new sample.
4. Build an Artificial Neural Network by implementing the Backpropagationalgorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier

model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

8. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

9. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem. 10. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

TOTAL : 60 HOURS

REFERENCES

: 1. Christopher Bishop, “Pattern Recognition and Machine Learning” Springer, 2007.

2. Stephen Marsland, “Machine Learning – An Algorithmic Perspective”, Chapman andHall, CRC Press, Second Edition, 2014.

3. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012.

4. Ethem Alpaydin, “Introduction to Machine Learning”, MIT Press, Third Edition, 2014.

5. Tom Mitchell, “Machine Learning”, McGraw-Hill, 1997.

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SEMESTER-IV

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS41/ CLOUD COMPUTING**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To understand the concept of cloud computing.
- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

COURSE OUTCOMES:

On Completion of the course, the students should be able to:

- Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- Learn the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- Explain the core issues of cloud computing such as resource management and security.
- Be able to install and use current cloud technologies.
- Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

UNIT I INTRODUCTION (9HRS)

Introduction to Cloud Computing – Definition of Cloud – Evolution of Cloud Computing – Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning.

UNIT II CLOUD ENABLING TECHNOLOGIES (9HRS)

Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures – Tools and Mechanisms – Virtualization of CPU –Memory – I/O Devices –Virtualization Support and Disaster Recovery.

UNIT III CLOUD ARCHITECTURE, SERVICES AND STORAGE (9HRS)

Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – laaS – PaaS – SaaS – Architectural Design Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

UNIT IV RESOURCE MANAGEMENT AND SECURITY IN CLOUD (9HRS)

Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud Resources – Security Overview – Cloud Security Challenges –Software-as-a-Service Security – Security Governance – Virtual Machine Security – IAM –Security Standards.

UNIT V CLOUD TECHNOLOGIES AND ADVANCEMENTS (9HRS)

Hadoop – MapReduce – Virtual Box — Google App Engine – Programming Environment for Google App Engine — Open Stack –Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation.

TOTAL: 45 Hours

REFERENCE BOOKS:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2013.
2. Rittinghouse, John W., and James F. Ransome,―Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS42/ ADVANCED DATABASE TECHNOLOGIES**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries..

COURSE OUTCOMES:

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

1. Understand the fundamental concepts of Database Management Systems and Entity Relationship Model and develop ER Models.

2. Build SQL Queries to perform data creation and data manipulation operations on databases.

3. Understand the concepts of functional dependencies, normalization and apply such knowledge to the normalization of a database.

4. Identify the issues related to Query processing and Transaction management in database management systems.

5. Analyze the trends in data storage, query processing and concurrency control of modern database technologies

UNIT I PARALLEL AND DISTRIBUTED DATABASES (9HRS)

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier

Client Server Architecture- Case Studies.

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES (9HRS)

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.

UNIT III XML DATABASES (9HRS)

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC– Information Retrieval – Data Warehousing – Data Mining.

UNIT IV MOBILE DATABASES (9HRS)

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes.

UNIT V INTELLIGENT DATABASES (9HRS)

Active databases – Deductive Databases – Knowledge bases – Multimedia Databases- Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases– Audio Databases – Multimedia Database Design.

TOTAL: 45 Hours

TEXT BOOKS

[1]. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.Graw

[2]. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach toDesign, Implementation and Management", Third Edition, Pearson Education, 2001.

[3]. The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling, 2nd JohnWiley & Sons, Inc. New York, USA, 2002

REFERENCE BOOKS

1] LiorRokach and OdedMaimon, *Data Mining and Knowledge Discovery Handbook*,Springer, 2nd edition, 2010

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS43/ DEEP LEARNING**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

The main aim of this course is to provide fundamental knowledge of neural networks and deep learning. On successful completion of the course, students will acquire fundamental knowledge of neural networks and deep learning, such as Basics of neural networks, shallow neural networks, deep neural networks, forward & backward propagation process and build various research projects

COURSE OUTCOMES

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

1. Design a simple Neural Networks using Linear Perceptron.
2. Implement a Convolutional Neural Networks
3. Develop an application based on Recurrent Neural Network.
4. Solve the Deep Reinforcement Learning problem.
5. Build the Speech and Text applications based deep neural network.

UNIT – I: ARTIFICIAL NEURAL NETWORKS (9HRS)

The Neuron – Activation Function – Gradient Descent – Stochastic Gradient Descent – Back Propagation – Business Problem.

UNIT – II: CONVOLUTIONAL NEURAL NETWORKS (9HRS)

Convolution Operation – ReLU layer – Pooling – Flattening – Full Conversion Layer – Softmax and Cross-Entropy.

UNIT – III: RECURRENT NEURAL NETWORKS (9HRS)

RNN intuition – Tackling Vanishing Gradient Problem – Long Short-Term Memory – Building a RNN – Evaluating the RNN – Improving the RNN – Tuning the RNN.

UNIT – IV: BOLTZMANN MACHINES (9HRS)

Introduction to Boltzmann Machine – Energy-Based Models – Restricted Boltzmann Machine – Contrastive Divergence – Deep Belief Networks – Deep Boltzmann Machine.

UNIT – V: COMPUTER VISION (9HRS)

Viola-Jones Algorithm – Haar-like Features – Integral Image – Training Classifiers – Adaptive Boosting – Cascading – Face Detection with Open CV.

TOTAL :45 Hours

TEXT BOOKS

1. Nikhil Buduma, Nicholas Locascio, "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", O'Reilly Media, 2017.
https://www.oreilly.com/ai/free/files/fundamentals-of-deep-learning-sampler.pdf
2. Li Deng and Dong Yu "Deep Learning Methods and Applications", Foundations and Trends in Signal Processing, 2013. http://link.springer.com/openurl?genre=book&isbn=978-3-319-73004-2

REFERENCE BOOKS:

1. Ian Goodfellow, "Deep Learning", MIT Press, 2017.
2. Josh Patterson, "Deep Learning: A Practitioner's Approach", PACKT, 2017.
3. Dipayan Dev, " Deep Learning with Hadoop", PACKT, 2017.
4. Francois Challot, " Deep learning with Python", Manning, 2017.
5. Hugo Larochelle's Video Lectures.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS44/ BUSINESS INTELLIGENCE**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

1. The student will define the importance of business intelligence.
2. The student will identify how various business intelligence systems can contribute to organizational success.
3. The student will apply common methods used in business intelligence.

COURSE OUTCOMES

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

1. Understand the essentials of BI & data analytics and the corresponding terminologies
2. Analyze the steps involved in the BI - Analytics process
3. Illustrate competently on the topic of analytics
4. Understand & Implement the K-Means Clustering with Iris Dataset
5. Demonstrate the real time scenario (Case study) by using BI & Analytics techniques

UNIT 1: BUSINESS INTELLIGENCE – INTRODUCTION (9HRS)

Introduction - History and Evolution: Effective and Timely decisions, Data Information and Knowledge, Architectural Representation, Role of mathematical Models, Real Time Business Intelligent System.

UNIT 2: BI – DATA MINING & WAREHOUSING (9HRS)

Data Mining - Introduction to Data Mining, Architecture of Data Mining and How Data mining works(Process) , Functionalities & Classifications of Data Mining, Representation of Input Data, Analysis Methodologies. Data Warehousing - Introduction to Data Warehousing, Data Mart, Online Analytical Processing (OLAP) – Tools, Data Modelling, Difference between OLAP and OLTP, Schema – Star and Snowflake Schemas, ETL Process – Role of ETL

UNIT 3: BI – DATA PREPARTTION (9HRS)

Data Validation - Introduction to Data Validation, Data Transformation – Standardization and Feature Extraction, Data Reduction – Sampling, Selection, PCA, Data Discretization

UNIT 4: BI – DATA ANALYTICS PROCESS (9HRS)

ANALYTICS PROCESS - Introduction to analytics process, Types of Analytical Techniques in BI – Descriptive, Predictive, Perspective, Social Media Analytics, Behavioral, Iris Datasets

UNIT 5: IMPLEMENTATION OF BI – ANALYTICS PROCESS (9HRS)

Operational Intelligence: Technological – Business Activity Monitoring, Complex Event Processing, Business Process Management, Metadata, Root Cause Analysis.

TOTAL :45 Hours

TEXT BOOKS

1. Carlo-Vercellis, "Business Intelligence Data Mining and Optimization for Decision-Making", First Edition Link : https://bit.ly/3d6XxOr

2. Drew Bentely, "Business Intelligence and Analytics" ,@2017 Library Pres., ISBN: 978-1-9789- 2136-8 Link : https://www.academia.edu/40285447/Business_Intelligence_and_Analytics

3. Larissa T. Moss & Shaku Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle For Decision-Support Applications", First Edition, Addison-Wesley Professional,2003

4. Kimball, R., Ross, M., Thornthwaite, W., Mundy, J., and Becker, B. John, "The Data Warehouse Lifecycle Toolkit: Practical Techniques for Building Data Warehouse and Business Intelligence Systems", Second Edition, Wiley & Sons, 2008.

REFERENCE BOOKS

1. Cindi Howson, "Successful Business Intelligence", Second Edition, McGraw-Hill Education, 2013.

E BOOKS

1. Ramesh Sharda, Dursun Delen, Efraim Turban, "Business Intelligence A Managerial Perspective on Analytics", Third Edition, Pearson Publications. Link : https://bit.ly/2YcuLHK

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS45/ BIG DATA ANALYTICS**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

To optimize business decisions and create competitive advantage with Big Data analytics

- To explore the fundamental concepts of big data analytics.
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.
- To introduce programming tools PIG & HIVE in Hadoop echo system

COURSE OUTCOME:

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

1. Work with big data platform and explore the big data analytics techniques business applications.
2. Design efficient algorithms for mining the data from large volumes.
3. Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
4. Explore on Big Data applications Using Pig and Hive.
5. Understand the fundamentals of various big data analytics techniques.
6. Build a complete business data analytics solution

UNIT-I INTRODUCTION TO BIG DATA(9HRS)

Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting.

UNIT-II MINING DATA STREAMS (9HRS)

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a

Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis- Stock Market Predictions.

UNIT-III HADOOP(9HRS)

History of Hadoop- the Hadoop Distributed File System – Components of Hadoop Analysing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS Basics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce FeaturesHadoop environment.

UNIT-IV FRAMEWORKS (9HRS)

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams.

UNIT-V PREDICTIVE ANALYTICS (9HRS)

Predictive Analytics -Simple linear regression- Multiple linear regression- Interpretation of regression coefficients. Visualizations - Visual data analysis techniques- interaction techniques - Systems and applications

TOTAL-45 HOURS

TEXT BOOK

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.

2. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.

References:

1. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012.

2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, CUP, 2012.

3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley& sons, 2012.

4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS4PA / CLOUD COMPUTING LABORATORY**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop

COURSE OUTCOMES

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

- Configure various virtualization tools such as Virtual Box, VMware workstation.
- Design and deploy a web application in a PaaS environment.
- Learn how to simulate a cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

LIST OF EXPERIMENTS

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top

of windows7 or 8.

2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs

3. Install Google App Engine. Create hello world app and other simple web applications using python/java.

4. Use GAE launcher to launch the web applications.

5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present

in CloudSim.

6. Find a procedure to transfer the files from one virtual machine to another virtual machine.

7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)

8. Install Hadoop single node cluster and run simple applications like wordcount.

TOTAL HOURS-60

REFERENCE BOOKS:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2013.
2. Rittinghouse, John W., and James F. Ransome,―Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS4PB / DEEP LEARNING LAB**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

The main aim of this course is to provide fundamental knowledge of neural networks and deep learning. On successful completion of the course, students will acquire fundamental knowledge of neural networks and deep learning, such as Basics of neural networks, shallow neural networks, deep neural networks, forward & backward propagation process and build various research projects

COURSE OUTCOMES

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

1. Understand the characteristics and types of artificial neural network and remember working of biological Neuron and Artificial Neural Network.
2. Apply learning algorithms on perceptron and apply back propagation learning on Neural Network.
3. Apply Feedback NN and plot a Boltzmann machine and associative memory on various application
4. Apply different types of auto encoders with dimensionality reduction and regularization.
5. Design Convolutional Neural Network and classification using Convolutional Neural Network.
6. Solve sequence learning problem and implement long short term memory and gated recurrent units..

LIST OF EXPERIMENTS

1. To Write a program to implement Perceptron.
2. To write a program to implement AND OR gates using Perceptron.

3. To implement Crab Classification using pattern net
4. To write a program to implement Wine Classification using Back propagation.
5. To write a MatLab Script containing four functions Addition, Subtraction, Multiply and Divide functions
6. Write a program to implement classification of linearly separable Data with a perceptron
7. To study Long Short Term Memory for Time Series Prediction
8. To study Convolutional Neural Network and Recurrent Neural Network
9. To study ImageNet, GoogleNet, ResNet convolutional Neural Networks
10. To study the use of Long Short Term Memory / Gated Recurrent Units to predict the stock prices based on historic data

TOTAL :60 Hours

TEXT BOOKS

1. Nikhil Buduma, Nicholas Locascio, "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", O'Reilly Media, 2017. https://www.oreilly.com/ai/free/files/fundamentals-of-deep-learning-sampler.pdf

2. Li Deng and Dong Yu "Deep Learning Methods and Applications", Foundations and Trends in Signal Processing, 2013. http://link.springer.com/openurl?genre=book&isbn=978-3-319-73004-2

REFERENCE BOOKS:

1. Ian Goodfellow, "Deep Learning", MIT Press, 2017.
2. Josh Patterson, "Deep Learning: A Practitioner's Approach", PACKT, 2017.
3. Dipayan Dev, " Deep Learning with Hadoop", PACKT, 2017.
4. Francois Challot, " Deep learning with Python", Manning, 2017.
5. Hugo Larochelle's Video Lectures.

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SEMESTER-V

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS51/ BUSINESS ANALYTICS**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To introduce the fundamental concepts of Business data analytics and associated methodologies

COURSE OUTCOMES

1. Understand and critically apply the concepts and methods of business analytics
2. Demonstration the various methodologies of descriptive statistics
3. Understanding of modeling uncertainty and statistical inference
4. Understanding of analytical frameworks

UNIT I OVERVIEW OF BUSINESS ANALYTICS (9HRS)

Introduction – Drivers for Business Analytics – Applications of Business Analytics: Marketing and Sales, Human Resource, Healthcare, Product Design, Service Design, Customer Service and Support – Skills Required for a Business Analyst – Framework for Business Analytics Life Cycle for Business Analytics Process.

UNIT II ESSENTIALS OF BUSINESS ANALYTICS (9HRS)

Descriptive Statistics – Using Data – Types of Data – Data Distribution Metrics: Frequency, Mean, Median, Mode, Range, Variance, Standard Deviation, Percentile, Quartile, z-Score, Covariance, Correlation – Data Visualization: Tables, Charts, Line Charts, Bar and Column Chart, Bubble Chart, Heat Map – Data Dashboards.

UNIT III MODELING UNCERTAINTY AND STATISTICAL INFERENCE (9HRS)

Modeling Uncertainty: Events and Probabilities – Conditional Probability – Random Variables

– Discrete Probability Distributions – Continuous Probability Distribution – Statistical Inference: Data Sampling – Selecting a Sample – Point Estimation – Sampling Distributions – Interval Estimation – Hypothesis Testing

UNIT IV ANALYTICS USING HADOOP AND MAPREDUCE FRAMEWORK(9HRS)

Introducing Hadoop – RDBMS versus Hadoop – Hadoop Overview – HDFS (Hadoop Distributed File System) – Processing Data with Hadoop – Introduction to MapReduce – Features of MapReduce – Algorithms Using Map-Reduce: Matrix-Vector Multiplication, Relational Algebra Operations, Grouping and Aggregation – Extensions to MapReduce.

UNIT V OTHER DATA ANALYTICAL FRAMEWORKS (9HRS)

Overview of Application development Languages for Hadoop – PigLatin – Hive – Hive Query Language (HQL) – Introduction to Pentaho, JAQL – Introduction to Apache: Sqoop, Drill and Spark, Cloudera Impala – Introduction to NoSQL Databases – Hbase and MongoDB.

TOTAL :45 Hours

TEXT BOOKS

1 .VigneshPrajapati, ―Big Data Analytics with R and Hadoop‖, Packt Publishing, 2013.

2 .Umesh R Hodeghatta, UmeshaNayak, ―Business Analytics Using R – A Practical Approach‖, Apress, 2017.

REFERENCE BOOKS

1 .AnandRajaraman, Jeffrey David Ullman, ―Mining of Massive Datasets‖, Cambridge University Press, 2012.

2 .Jeffrey D. Camm, James J. Cochran, Michael J. Fry, Jeffrey W. Ohlmann, David R. Anderson, ―Essentials of Business Analytics‖, Cengage Learning, second Edition, 2016

3 .U. Dinesh Kumar, ―Business Analytics: The Science of Data-Driven Decision Making‖, Wiley, 2017.

4 .A. Ohri, ―R for Business Analytics‖, Springer, 2012 7. Rui Miguel Forte, ―Mastering Predictive Analytics with R‖, Packt Publication, 2015.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS52/ COMPILER DESIGN**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

- To learn the various phases of compiler.

  To learn the various parsing techniques.

  To understand intermediate code generation and run-time environment.

  To learn to implement front-end of the compiler.

  To learn to implement code generator

COURSE OUTCOMES

After learning the course the students should be able to:

1. Understand the basic concepts and application of Compiler Design

2. Apply their basic knowledge Data Structure to design Symbol Table, Lexical Analyser , Intermediate Code Generation, Parser (Top Down and Bottom Up Design) and will able to understand strength of Grammar and Programming Language.

3. Understand various Code optimization Techniques and Error Recovery mechanisms.

4. Understand and Implement a Parser.

UNIT I INTRODUCTION TO COMPILERS 9HRS

Structure of a compiler – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Lex – Finite Automata – Regular Expressions to Automata – Minimizing DFA.

UNIT II SYNTAX ANALYSIS 9HRS

Role of Parser – Grammars – Error Handling – Context-free grammars – Writing a grammar – Top Down Parsing – General Strategies Recursive Descent Parser Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item Construction of SLR Parsing Table - Introduction to LALR Parser – Error Handling and Recovery in Syntax Analyzer-YACC.

UNIT III INTERMEDIATE CODE GENERATION 9HRS

Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking.

UNIT IV RUN-TIME ENVIRONMENT AND CODE GENERATION 9HRS

Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management – Issues in Code Generation – Design of a simple Code Generator.

UNIT V CODE OPTIMIZATION 9HRS

Principal Sources of Optimization – Peep-hole optimization – DAG- Optimization of Basic BlocksGlobal Data Flow Analysis – Efficient Data Flow Algorithm.

TOTAL HOURS-45

TEXT BOOK:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and Tools‖, Second Edition, Pearson Education, 2009.

REFERENCES

1. Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures: A Dependence based Approach, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, Advanced Compiler Design and Implementation‖, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, Engineering a Compiler‖, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. V. Raghavan, Principles of Compiler Design‖, Tata McGraw Hill Education Publishers, 2010.
5. Allen I. Holub, Compiler Design in C‖, Prentice-Hall Software Series, 1993.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS5PA / COMPILER DESIGN LAB**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

COURSE OBJECTIVES

- To learn the various phases of compiler.
- To learn the various parsing techniques.
- To understand intermediate code generation and run-time environment.
- To learn to implement front-end of the compiler.
- To learn to implement code generator

COURSE OUTCOMES

After learning the course the students should be able to:

1. Understand the basic concepts and application of Compiler Design

2. Apply their basic knowledge Data Structure to design Symbol Table, Lexical Analyser , Intermediate Code Generation, Parser (Top Down and Bottom Up Design) and will able to understand strength of Grammar and Programming Language.

3. Understand various Code optimization Techniques and Error Recovery mechanisms.

4. Understand and Implement a Parser.

LIST OF EXPERIMENTS:

1. Implementation of symbol table.

2. Develop a lexical analyzer to recognize a few patterns in c (ex. Identifers, constants, comments, operators etc.)

3. Implementation of lexical analyzer using lex tool.

4. Generate yacc specification for a few syntatic categories.

a) Program to recognize a valid arithmetic expression that uses operator +, -, * and /.

b) Program to recognize a valid variable which starts with a letter followed by any number of letter or digits.

c) Implementation of calculator using lex and yacc.

5. Convert the bnf rules into yacc form and write code to generate abstract syntax tree.

6. Implement type checking

7. Implement control flow analysis and data flow analysis.

8. Implement any one storage allocation strategies(heap, stack, static)

9. Construction of DAG

10. Implement the back end of the compiler which takes the three address code and produces the 8086nassembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move , add, sub, jump. Also simple addressing modes are used.

11. Implementation of simple code optimization techniques (constant folding. etc.)

Total Hours-60

TEXTBOOK:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques and Tools‖, Second Edition, Pearson Education, 2009.

REFERENCES

1. Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures: A Dependence based Approach, Morgan Kaufmann Publishers, 2002.

2. Steven S. Muchnick, Advanced Compiler Design and Implementation‖, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.

3. Keith D Cooper and Linda Torczon, Engineering a Compiler‖, Morgan Kaufmann Publishers Elsevier Science, 2004.

4. V. Raghavan, Principles of Compiler Design‖, Tata McGraw Hill Education Publishers, 2010.

5. Allen I. Holub, Compiler Design in C‖, Prentice-Hall Software Series, 1993.

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SEMESTER-VI

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS61/ SOFTWARE PROJECT MANAGEMENT**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

The aims of the course are as follows

- Understand the fundamental principles of Software Project management
- Be familiar with the different methods and techniques used for project management.
- By the end of this course the student will have good knowledge of the issues and challenges faced while doing the Software project Management.
- Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques

COURSE OUTCOMES

At the completion of this course, the student will able to

• Understand and practice the process of project management and its application in delivering successful IT projects;

• Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities;

• Understand and use risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales;

• Identify the resources required for a project and to produce a work plan and resource schedule;

• Monitor the progress of a project and to assess the risk of slippage, revising targets or counteract drift;

• Distinguish between the different types of project and follow the stages needed to negotiate an appropriate contract

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9HRS

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9HRS

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation – software effort estimation.

UNIT III ACTIVITY PLANNING 9HRS

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – forward Pass – backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature of Risk – Types of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning and Control.

UNIT IV MONITORING AND CONTROL 9HRS

Resource allocation – identifying and scheduling resources – publishing resource and cost schedule – scheduling sequence – Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back to Target – change control – Managing Contracts – Introduction – Types of Contract – Stages In Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9HRS

Introduction – Understanding Behavior – Organizatinal Behaviour – Selecting the Right person. Instruction In The Best Methods – Motivation– The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress –Health And Safety – Case Studies.

Total Hours –45

TEXT BOOK:

1. Bob Hughes, “Mike Cotterell, Rajib Mall, Software Project Management”, 5th Edition, The McGraw-Hill Higher Education, ISBN :13:978-0-07-10724- 8 , 2011.

REFERENCE:

1. S. A. Kelkar, “Software Project Management: A Concise Study”, 3rd edition, PHI learning

pvt Ltd ,ISBN: 9788120347021, 2013.

2. Robert K. Wysocki, "Effective Project Management – Traditional, Agile, Extreme", 6th Edition, Wiley Publication, ISBN: 1118080653, 2011.

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LIST OF PROFESSIONAL ELECTIVE COURSES

PROGRAM ELECTIVE COURSE-1

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS46/ INTERNET OF THINGS (IOT)**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To explain about the definition and usage of Internet of things
- To explain the key components of IoT system

COURSE OUTCOMES:

1. Explain the definition and usage of the term ―Internet of Things‖ in different contexts
2. Understand the key components that make up an IoT system
3. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack
4. Apply the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis
5. Discover where the IoT concept fits within the broader ICT industry and possible future trends

UNIT I Introduction to IoT (9HRS)

Introduction – Definition and Characteristics of IoT, Physical Design of IoT; Things in IOT, Logical Design of IoT; IoT Functional Blocks, IoT Communication APIs, IoT Enabling Technologies; WSN, Cloud Computing, Big Data Analysis, Communication Protocols, Embedded Systems

UNIT II IoT Hardware (9HRS)

IoT Hardware, Devices and Platforms – Basics of Arduino Hardware, The Arduino IDE, Basic Arduino Programming, Basics of Raspberry pi; Introduction to Raspberry pi, Programming with Raspberry pi, CDAC IoT devices: Ubimote, Wi-Fi mote, BLE Mote, WINGZ gateway, Introduction to IoT Platforms, IoT Sensors and actuators

UNIT III IoT Protocols (9HRS)

IoT Protocols – IoT Data link Protocols, Network Layer Routing Protocols, Network Layer Encapsulation Protocols, Session Layer Protocols, IoT Security Protocols, Service Discovery Protocols, Infrastructure Protocols.

UNIT IV IoT Programming (9HRS)

IoT Programming – Arduino Programming: Serial Communications – Getting Input from Sensors, Visual, Physical and Audio Outputs, Remotely Controlling External Devices, Wireless Communication, Programming with Raspberry pi: Basics of python Programming, Python Packages of IoT, IoT Programming with CADC IoT devices.

UNIT V Domain Specific IoT (9HRS)

Domain Specific IoT – Home automation, smart cities, Smart Environment, IoT in Energy, Logistics, Agriculture, industry and Health & Life style sensors, Case Studies: A Case Study of Internet of Things Using Wireless Sensor Networks and Smart Phones, Security Analysis of Internet-of-Things: A Case Study of August Smart Lock, Open IoT Platform.

TOTAL: 45 Hours

TEXT BOOKS

1. Vijay Madisetti and ArshdeepBahga, ―Internet of Things (A Hands-on-Approach), 1st Edition, VPT, 2014.

REFERENCE BOOKS

1. Margolis, Michael. ―Arduino CooK book: Receipes t obegin, Expand and Enhance Your Projects‖. O'Reilly Media Inc.2011.
2. Monk, Simon. Raspberry Pi Cookbook: Software and hardware problems and Solutions. O'Reilly Media,Inc. 2016.

Related Online Contents (MOOC, SWAYAM,NPTEL, Websites etc)

1.https://onlinecourses.swayam2.ac.in/aic20_sp06/preview

2.https://onlinecourses.swayam2.ac.in/arp19_ap79/preview

3. Marco Schwatrz, "Internet of Things with Arduino Cookbook", Packt Publications, 2016.

4. Rajkumar Buyya, Christian Vecchiola. S.ThamaraiSelvi, "Mastering Cloud Computing", McGraw Hill Education, 2013.

5. Nick Antonopoulos and Lee Gillam, "Cloud Computing: Principles, Systems and Applications", Second Edition, Springer, 2017.

Extensive Reading:

1.https://azure.microsoft.com/en-in/overview/what-is-cloud-computing/

2.https://aws.amazon.com/iot/

3.http://postscapes.com/projects

4.http://www.theinternetofthings.eu/what-is-the-internet-of-things

5.https://www.theinternetofthings.eu/digital-world-iot

6.https://cloud.google.com/solutions/iot

7.https://swayam.gov.in/nd1_noc20_cs20

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS47/ INTELLIGENT DATABASE SYSTEM**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

1. The student will define the importance of business intelligence.
2. The student will identify how various business intelligence systems can contribute to organizational success.
3. The student will apply common methods used in business intelligence.

COURSE OUTCOMES :

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

1. Understand the concepts of Intelligent database.
2. Make study of the Database installation then create the database with user and apply SQL.
3. Understand the concepts of knowledge-based systems and apply with AI
4. Design and create the small applications
5. Analyse and Implement for various real-time applications in Intelligent Database System

UNIT 1: INTRODUCTION TO IDBS (9HRS)

Informal definition of the domain - General characteristics of IDBSs - Data models and the relational data model - A taxonomy of intelligent database systems - Guidelines for using intelligent database systems.

UNIT 2: SEMANTIC DATA MODELS (9HRS)

Nested and semantic data models – Introduction - The nested relational model - Semantic models - Hyper-semantic data models - Object-oriented approaches to semantic data modeling – Object oriented database systems - Basic concepts of a core object-oriented data model - Comparison with other data models - Query languages and query processing - Operational aspects – Systems – The ODMG standard - The object-relational data model - Java and

databases – Conclusions – Active database systems - Basic concepts – Issues – Architectures - Research relational prototypes—the Starburst Rule System - Commercial relational approaches.

UNIT 3: KNOWLEDGE-BASED SYSTEMS- AI CONTEXT (9HRS)

Characteristics and classification of the knowledge-based systems – Introduction - The resolution principle - Inference by inheritance – Conclusion - Deductive database systems - Basic concepts -DATALOG language - Deductive database systems and logic programming systems—differences -Architectural approaches - Research prototypes - Updates in deductive databases - Integration of deductive database and object database technologies - Constraint databases – Conclusions

UNIT 4: ADVANCED KNOWLEDGE-BASED SYSTEMS (9HRS)

Introduction - Architectural solutions - The 'general bridge' solution - Extending a KBS with components proper to a DBMS - The 'tight coupling' approach – Conclusion - Advanced solutions: Introduction - A 'knowledge level' approach to the interaction with an IAS- TELOS - a language for implementing very large 'integral approach' systems- The CYC project - Other projects based on a 'conceptual representation' approach - Lexical approaches to the construction of large KBs.

UNIT5: APPLICATIONS IN IDBS (9HRS)

Introduction - Temporal databases - Basic concepts - Temporal data models - Temporal query languages – Ontologies -Ontology theoretical foundations - Environments for building ontologies - Structured, semi-structured and unstructured data - Multimedia database - Semi-structured data - Mediators – Motivation – Architecture - Application of mediators to heterogeneous systems –Proposals - Multi-Agents systems - Main issues in designing a multi-agent system - Open problems. Internet indexing and retrieval - Basic indexing methods - Search engines or meta-searchers – Internet spiders - Data mining - Data mining tasks - Data mining tools - Medical and legal information systems - Medical information systems - Legal information systems – Conclusions.

TOTAL :45 Hours

TEXT BOOKS

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, “Intelligent Database Systems ”,Collection ACM Press.

REFERENCE BOOKS

1. Ngoc Thanh Nguyen, Radoslaw Katarzyniak and Shyi-MingC hen "Advances inIntelligent Information and Database Systems ", Springer, 2010.

E BOOKS

1. https://www.eyrolles.com/Informatique/Livre/intelligent-database-systems-9780201877366/

MOOC

1. https://www.coursera.org/learn/database-management

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS48/ BUSINESS ENVIRONMENT			
YEAR / SEMESTER	II / IV			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To expose the students to various environment factors related to the business and to develop the skills required to take better business decisions at right time.

COURSE OUTCOMES

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

i. Identify the impact of business environment on business decisions.

ii. Illustrate the effects of government policy on the economic environment.

iii. Predict the legal framework on the regulation of business entity.

iv. Assess of the social responsibility of business.

v. Evaluate the pros and cons of New Technology Policy of India.

UNIT I Business and its Environment: 9HRS

Introduction - Characteristics of Modem Business - Concept and Nature of Business Environment - Characteristics of Environment - Micro and Macro Environment - Impact of Business Environment on Business Decision - Process of Environment Analysis for Business Decisions.

UNIT II Economic Environment: 9HRS

Meaning - Concept and Nature of Economic Environment - Critical Elements of Economic Environment - Basic Economic Systems – Impact of Economic Environment on Business – Economic Policy – Liberalization – Privatization – Globalization.

UNIT III Political and Legal Environment: 9HRS

Concept and Nature of Political and Legal Environment - Components of Political and Legal Environment - Economic Role of Government - Regulatory role, Promotional role, Entrepreneurial role and Planning role - State Intervention in Business - Pros and Cons of Intervention.

UNIT IV Socio-Cultural Environment: 9HRS

Concept and Nature of Socio-Cultural Environment - Components of Socio-Cultural Environment - Impact of Socio-Cultural Environment on Business, Culture and Globalization - Social Responsibility of Business – Arguments for and Against Social Responsibility.

UNIT V Natural and Technological Environment: 9HRS

Natural environment – Meaning and its Impact on Business - Natural Pollution- Meaning - Types. Concept and Nature of Technological Environment - Elements of Technological Environment - Technology and Society - Economic Effect of Technology - New Technology Policy of India.

TOTAL HOURS-45

Text Book

Francis Cherunilam, Business Environment, Himalaya Publications House, New Delhi, 2018.

Reference Books

1. Shaikh, Business Environment, Pearson's Publications, New Delhi, 2016.

2. Sundaram & Black, Business Environment, Prentice Hall of India, New Delhi, 2015.

3. Ashwathappa, Essentials of Business Environment, Himalaya Publishing House, Mumbai, 2017.

4. Dhar P.K, Business Environment, Kalyani Publishers, New Delhi, 2015.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS49/ AUGMENTED REALITY &VIRTUAL REALITY**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To introduce the relevance of this course to the existing technology through demonstrations, case studies and applications with a futuristic vision along with socio-economic impact and issues
- To understand virtual reality, augmented reality and using them to build Biomedical engineering applications
- To know the intricacies of these platform to develop PDA applications with better optimality

COURSE OUTCOMES:

Upon completing this course, students will be able to:

- Analyse & Design a system or process to meet given specifications with realistic engineering constraints.
- Identify problem statements and function as a member of an engineering design team.
- Utilize technical resources
- Propose technical documents and give technical oral presentations related to design mini project results.

UNIT I INTRODUCTION (9HRS)

The three I's of virtual reality-commercial VR technology and the five classic components of a VR system - Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation-interfaces and gesture interfaces-Output Devices: Graphics displays-sound displays & haptic feedback.

UNIT II VR DEVELOPMENT PROCESS (9HRS)

Geometric modeling - kinematics modeling- physical modeling - behaviour modeling - model

Management.

UNIT III CONTENT CREATION CONSIDERATIONS FOR VR (9HRS)

Methodology and terminology-user performance studies-VR health and safety issues-Usability of virtual reality system- cyber sickness -side effects of exposures to virtual reality environment

UNIT IV VR ON THE WEB & VR ON THE MOBILE (9HRS)

JS-pros and cons-building blocks (WebVR, WebGL, Three.js, device orientation events)-frameworks (A-frame, React VR)-Google VR for Android-Scripts, mobile device configuration, building to android-cameras and interaction-teleporting-spatial audio-Assessing human parameters-device development and drivers-Design Haptics

UNIT V APPLICATIONS (9HRS)

Medical applications-military applications-robotics applications- Advanced Real time Trackingother applications- games, movies, simulations, therapy

TOTAL : 45 Hours

TEXT BOOKS:

1.C. Burdea & Philippe Coiffet, "Virtual Reality Technology", Second Edition, Gregory, John Wiley & Sons, Inc.,2008

2. Jason Jerald. 2015. The VR Book: Human-Centred Design for Virtual Reality. Association for Computing Machinery and Morgan & Claypool, New York, NY, USA.

REFERENCE BOOKS:

1. Augmented Reality: Principles and Practice (Usability) by Dieter Schmalstieg & Tobias Hollerer, Pearson Education (US), Addison-Wesley Educational Publishers Inc, New Jersey, United States, 2016. ISBN: 9780321883575

2. Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability),Steve Aukstakalnis, Addison-Wesley Professional; 1 edition, 2016.

3. The Fourth Transformation: How Augmented Reality & Artificial Intelligence Will Change Everything, Robert Scoble & Shel Israel, Patrick Brewster Press; 1 edition, 2016.

4. Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop,

Web, and Mobile, Tony Parisi, O'Reilly Media; 1 edition, 2015.

5. Programming 3D Applications with HTML5 and WebGL: 3D Animation and Visualization for Web Pages, Tony Parisi, O'Reilly Media; 1 edition, 2014.

6. Learning Three.js: The JavaScript 3D Library for WebGL - Second Edition, Jos Dirksen, Packt Publishing - ebooks Account; 2nd Revised ed. Edition 2015.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS50/ INFORMATION RETRIEVAL AND MANAGEMENT**			
YEAR / SEMESTER	**II / IV**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To use an open source search engine framework and explore its capabilities, represent documents in different ways and discuss its effect on similarity calculations and on search, modify Page Rank and HITS algorithms or Personalization, Semantic or any other aspect, design and implement an innovative feature in a search engine and explain the search components affected by the innovation, design a smart information management system with Information Retrieval components

COURSE OUTCOMES

UNIT I INTRODUCTION 9HRS

Introduction -History of IR- Components of IR - Issues –Open source Search engine Frameworks, The impact of the web on IR - The role of artificial intelligence (AI) in IR – IR Versus Web Search - Components of a Search engine- Characterizing the web

UNIT II INFORMATION RETRIEVAL 9HRS

Boolean and vector-space retrieval models- Term weighting - TF-IDF weighting- cosine similarity – Preprocessing - Inverted indices - efficient processing with sparse vectors – Language Model based IR - Probabilistic IR –Latent Semantic Indexing - Relevance feedback and query expansion

UNIT III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING 9HRS

Web search overview, web structure, the user, paid placement, search engine optimization/ spam. Web size measurement - search engine optimization/spam – Web Search Architectures - crawling - meta-crawlers- Focused Crawling - web indexes –- Near-duplicate detection - Index Compression - XML retrieval

UNIT IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH 9HRS

Link Analysis –hubs and authorities - PageRank and HITS algorithms -Searching and Ranking – Relevance Scoring and ranking for Web – Similarity - Hadoop & MapReduce - Evaluation - Personalized search - Collaborative filtering and content-based recommendation of documents and products – handling "invisible" Web - Snippet generation, Summarization, Question Answering, Cross-Lingual Retrieval

UNIT V DOCUMENT TEXT MINING 9HRS

Information filtering; organization and relevance feedback – Text Mining -Text classification and clustering - Categorization algorithms: naive Bayes; decision trees; and nearest 99 neighbor - Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM)

TOTAL: 45 PERIODS

TEXT BOOKS:

1. C. Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval , Cambridge University Press, 2008.

2. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, Modern Information Retrieval: The Concepts and Technology behind Search (2nd Edition) (ACM Press Books) 2011.

3. Bruce Croft, Donald Metzler and Trevor Strohman, Search Engines: Information Retrieval in Practice, Addison Wesley; 1 edition 2009

4. Mark Levene, An Introduction to Search Engines and Web Navigation, Wiley; 2 edition, 2010.

REFERENCES:

1. Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

2. Ophir Frieder Information Retrieval: Algorithms and Heuristics (The Information Retrieval Series)(2nd Edition), Springer; 2nd edition, 2004 3. Manu Konchady, Building Search Applications: Lucene, LingPipe, and Gate Mustru Publishing; First edition,2008

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ELECTIVE COURSES-II AND III

PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS53/ ENTERPRISE RESOURCE PLANNING			
YEAR / SEMESTER	III / V			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

The aims of the course are as follows

- Comprehend the role and function of human resource management in industry.
- Describe how to strategically plan for the human resources needed to meet the organizational needs.
- Gain insight of concepts of job analysis and compensation function and their legal provisions.

COURSE OUTCOMES

At the completion of this course, the student will able to

- Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components.
- Understand production planning in an ERP system, and systematicallyDevelop plans for an enterprise.
- Understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control.

UNIT I INTRODUCTION 9HRS

ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, DataMining,OLAP,SCM

UNIT II ERP IMPLEMENTATION 9HRS

ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring

UNIT III BUSINESS MODULES 9HRS

Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

UNIT IV THE ERP MARKET 9HRS

ERP Market Place, SAP AG, Peoplesoft, Baan, JD Edwards, Oracle, QAD, SSA

UNIT V ERP – PRESENT AND FUTURE 9HRS

Turbo Charge the ERP System, EIA, ERP and e-Commerce, ERP and Internet, Future Directions

Total Hours –45

TEXT BOOKS:

1.Alexis Leon, Enterprise Resource Planning, second edition, Tata McGrawHill, 2008.

REFERENCES:

1. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

2. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS54/ DATA MINING USING R**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

To impart knowledge on

- Apply various Data manipulation techniques in R to import and export data
- Apply classification and regression techniques in R
- Implement programs of clustering & outlier detection in R
- Build association rules & perform time series forecasting in R
- Explore R for various applications

COURSE OUTCOMES:

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

1. Apply the basics of R programming to perform import & export
2. Apply the supervised learning techniques in R
3. Use R to perform clustering and to detect outliers
4. Explore data analysis for time series and build association rules
5. Applr R for text mining and other applications

Unit I BASICS OF R & DATA IMPORT EXPORT (9HRS)

Introduction to Data Mining – Basics of R – Working with Datasets in R – Data Import and Export – Save and Load Data in Different Formats - Data Types – Vectors & operations – Matrices – Arrays – Factors & operations – Data Frames – Sub setting of Data Frames – List – Data Exploration and Visualization

Unit II CLASSIFICATION & REGRESSION (9HRS)

Supervised Learning – Classification – Decision Tress – Working with party and rpart module – Random Forest – Regression – Linear Regression – Logistic Regression – Non Linear

Regression

Unit III CLUSTERING & OUTLIER DETECTION(9HRS)

Unsupervised Learning – K-Means Clustering – K-Medoids Clustering – Hierarchical Clustering – Density-based Clustering – Outlier Detection – Univariate Outlier Detection – Detect by Clustering – Time Series – With LOF

Unit IV TIME SERIES & ASSOCIATION RULES (9HRS)

Time Series Data in R – Decomposition – Time Series Forecasting – Time Series Clustering – Time Series Classification – Association Rule Mining – Removing Redundancy – Interpreting Rules – Visualizing Association Rules

Unit V TEXT MINING &SOCIAL NETWORK ANALYSIS (9HRS)

Text Mining – Applications in R – Social Network Analysis – Network of Terms – Network of Tweets – Two-Mode Network – Analysis and Forecasting of House Price Indices - Customer Response Prediction and Profit Optimization

TOTAL :45 Hours

TEXT BOOKS:

1. Yanchang Zhao, “R and Data Mining: Examples and Case Studies”, Academic Press, First Edition, 2013

Reference Books:

1. K.G.Srinivasa, G M Siddesh, Chetan Shetty, “Statistical Programming in R”, Oxford University Press, New Delhi, 2017

2. John Chambers, “Software for Data Analysis: Programming with R “, Springer; 1st ed. 2008. , 2nd printing 2009 edition

3. Thomas Lumley,” Complex Surveys: A Guide to Analysis Using R”, Wiley Series in survey methodology, 2010

4. Nicholas J. Horton, Ken Kleinman,” Using R and RStudio for Data Management, Statistical Analysis, and Graphics” , CRC Press, Second edition, 2015

5. John Maindonald, W. John Braun, ”Data Analysis and Graphics Using R: An Example-Based Approach”, University Press, Cambridge, Third edition, 2010

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS55/ IMAGE PROCESSING AND ANALYSIS			
YEAR / SEMESTER	III / V			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES:

- To understand the image processing concepts and analysis
- To understand the image processing techniques
- To familiarize the image processing environment and their applications,
- To appreciate the use of image processing in various applications

COURSE OUTCOMES:

Upon completion of this course, a students should be able to:

1. Design and implement algorithms for image processing applications that incorporates different concepts of medical Image Processing
2. Familiar with the use of MATLAB and its equivalent open source tools
3. Critically analyze different approaches to image processing applications
4. Explore the possibility of applying Image processing concepts in various applications

UNIT I IMAGE PROCESSING FUNDAMENTALS(9HRS)

Introduction – Elements of visual perception, Steps in Image Processing Systems – Digital Imaging System - Image Acquisition – Sampling and Quantization – Pixel Relationships – File Formats – colour images and models - Image Operations – Arithmetic, logical, statistical and spatial operations.

UNIT II IMAGE ENHANCEMENT AND RESTORATION(9HRS)

Image Transforms -Discrete and Fast Fourier Transform and Discrete Cosine Transform ,Spatial Domain - Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain: Filtering in Frequency Domain – Smoothing and Sharpening filters – Homomorphic Filtering., Noise models, Constrained and Unconstrained restoration models.

UNIT III IMAGE SEGMENTATION AND MORPHOLOGY(9HRS)

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Motion Segmentation, Image Morphology: Binary and Gray level morphology operations - Erosion, Dilation, Opening and Closing Operations Distance Transforms- Basic morphological Algorithms. Features – Textures - Boundary representations and Descriptions- Component Labeling – Regional descriptors and Feature Selection Techniques.

UNIT IV IMAGE ANALYSIS AND CLASSIFICATION (9HRS)

Image segmentation- pixel based, edge based, region based segmentation. Active contour models and Level sets for medical image segmentation, Image representation and analysis, Feature extraction and representation, Statistical, Shape, Texture, feature and statistical image classification.

UNIT V IMAGE REGISTRATION AND VISUALIZATION (9HRS)

Rigid body visualization, Principal axis registration, Interactive principal axis registration, Feature based registration, Elastic deformation based registration, Image visualization – 2D display methods, 3D display methods, virtual reality based interactive visualization.

TOTAL : 45 PERIODS

REFERENCES:

1. Alasdair McAndrew, ―Introduction to Digital Image Processing with Matlab‖, Cengage Learning 2011,India
2. Anil J Jain, ―Fundamentals of Digital Image Processing‖, PHI, 2006.
3. Kavyan Najarian and Robert Splerstor,‖ Biomedical signals and Image processing‖,CRC – Taylor and Francis, New York, 2006
4. Rafael C.Gonzalez and Richard E.Woods, ―Digital Image Processing‖, Third Edition, Pearson Education, 2008, New Delhi
5. S.Sridhar, ―Digital Image Processing‖, Oxford University Press, 2011

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS56/ STREAM PROCESSING AND ANALYTICS**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

To study the design and architecture of modern distributed streaming systems as well as fundamental algorithms for analyzing data streams

COURSE OUTCOMES

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

1. Explain the need for stream processing
2. Comprehend the architectures of stream processing.
3. Explain and run Distributed Processing and Resilience Model
4. Design effective streaming solutions using Structured Streaming
5. Design effective streaming solutions using Spark Streaming

UNIT 1: INTRODUCTION TO STREAM PROCESSING MODEL (9HRS)

Fundamentals of Stream Processing: What Is Stream Processing? Examples of Stream Processing- Scaling Up Data Processing- Distributed Stream Processing- Introducing Apache Spark. Stream-Processing Model: Sources and Sinks- Immutable Streams Defined from One Another- Transformations and Aggregations- Window Aggregations - Stateless and Stateful Processing- The Effect of Time.

UNIT 2: STREAMING ARCHITECTURES (9HRS)

Components of a Data Platform- Architectural Models- The Use of a Batch-Processing Component in a Streaming Application- Referential Streaming Architectures- Streaming Versus Batch Algorithms. Apache Spark as a Stream-Processing Engine: Spark's Memory Usage- Understanding Latency- Throughput- Oriented Processing- Fast Implementation of Data Analysis.

UNIT 3: DISTRIBUTED PROCESSING AND RESILIENCE MODEL (9HRS)

Spark's Distributed Processing Model: Running Apache Spark with a Cluster Manager- Spark's Own Cluster Manager - Resilience and Fault Tolerance in a Distributed System- Data Delivery Semantics- Microbatching and One-Element-at-a-Time - Bringing Microbatch and One-Record-at a- Time Closer Together- Dynamic Batch Interval- Structured Streaming Processing Model. Spark's Resilience Model: Resilient Distributed Datasets in Spark - Spark Components - Spark's Fault-Tolerance Guarantees

UNIT4: STRUCTURED STREAMING (9HRS)

Introducing Structured Streaming- The Structured Streaming Programming Model – Structured Streaming in Action – Structured Streaming Sources – Structured Streaming Sinks - Event Time– Based Stream Processing.

UNIT 5: SPARK STREAMING (9HRS)

Introducing Spark Streaming - The Spark Streaming Programming Model - The Spark Streaming Execution Model - Spark Streaming Sources - Spark Streaming Sinks - Time-Based Stream Processing- Working with Spark SQL – Checkpointing - Monitoring Spark Streaming- Performance Tuning.

TOTAL :45 Hours

TEXT BOOKS

1.Gerard Maas and Francois Garillot , "Stream Processing with Apache Spark: Mastering Structured nStreaming and Spark Streaming", O'Reilly, 2019.

REFERENCE BOOKS

1.Henrique C. M. Andrade, Buğra Gedik and Deepak S. Turaga, "Fundamentals of Stream Processing: Application Design, Systems, and Analytics", Cambridge University Press, 2014.

2.Bryon Ellis, "Real-Time Analytics: Techniques to Analyze and Visualize Streaming Data", Wiley, 1st edition, 2014.

3.Anindita Basak, Krishna Venkataraman, Ryan Murphy, Manpreet Singh, "Stream Analytics with Microsoft Azure", Packt Publishing, December 2017.

E BOOKS/SUPPORTING RESOURCES

1. https://github.com/stream-processing-with-spark

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS57/ NATURAL LANGUAGE PROCESSING**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To tag a given text with basic Language processing features, design an innovative application using NLP components, implement a rule based system to tackle morphology/syntax of a Language, design a tag set to be used for statistical processing keeping an application in mind, design a Statistical technique for a new application, Compare and contrast use of different statistical approaches for different types of applications.

COURSE OUTCOMES

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

1.Analyze the natural language text.

2.Generate the natural language.

3.Demonstrate Text mining.

4.Apply information retrieval techniques.

UNIT-1 OVERVIEW AND LANGUAGE MODELING: (9HRS)

Overview: Origins and challenges of NLPLanguage and Grammar-Processing Indian Languages- NLP Applications-Information Retrieval. Language Modeling: Various Grammar- based Language Models-Statistical Language Model.

UNIT-2 WORD LEVEL AND SYNTACTIC ANALYSIS: (9HRS)

Word Level Analysis: Regular ExpressionsFinite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free GrammarConstituency- Parsing-Probabilistic Parsing.

UNIT - 3 Extracting Relations from Text: (9HRS)

From Word Sequences to Dependency Paths: Introduction, Subsequence Kernels for Relation

Extraction, A Dependency-Path Kernel for Relation Extraction and Experimental Evaluation. Mining Diagnostic Text Reports by Learning to Annotate Knowledge Roles: Introduction, Domain Knowledge and Knowledge Roles, Frame Semantics and Semantic Role Labeling, Learning to Annotate Cases with Knowledge Roles and Evaluations. A Case Study in Natural Language Based Web Search: InFact System Overview, The GlobalSecurity.org Experience.

UNIT -4 Evaluating Self-Explanations in iSTART: Word Matching, Latent Semantic Analysis, and Topic Models (9HRS)

Introduction, iSTART: Feedback Systems, iSTART: Evaluation of Feedback Systems, Textual Signatures: Identifying Text-Types Using Latent Semantic Analysis to Measure the Cohesion of Text Structures: Introduction, Cohesion, Coh-Metrix, Approaches to Analyzing Texts, Latent Semantic Analysis, Predictions, Results of Experiments. Automatic Document Separation: A Combination of Probabilistic Classification and Finite-State Sequence Modeling: Introduction, Related Work, Data Preparation, Document Separation as a Sequence Mapping Problem, Results. Evolving Explanatory Novel Patterns for Semantically-Based Text Mining: Related Work, A Semantically Guided Model for Effective TextMining.

UNIT-5 INFORMATION RETRIEVAL AND LEXICAL RESOURCES: (9HRS)

Information Retrieval Design features of Information Retrieval Systems-Classical, Non classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame Net- Stemmers-POS Tagger- Research Corpora.

TOTAL :45 Hours

TEXT BOOKS

1. Nikhil Buduma, Nicholas Locascio, “Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms”, O'Reilly Media, 2017. https://www.oreilly.com/ai/free/files/fundamentals-of-deep-learning-sampler.pdf

2. Li Deng and Dong Yu “Deep Learning Methods and Applications”, Foundations and Trends in Signal Processing, 2013. http://link.springer.com/openurl?genre=book&isbn=978-3-319-73004-2

REFERENCE BOOKS:

1. Ian Goodfellow, “Deep Learning”, MIT Press, 2017.

2. Josh Patterson, “Deep Learning: A Practitioner’s Approach”, PACKT, 2017.

3. Dipayan Dev, “ Deep Learning with Hadoop”, PACKT, 2017.

4. Francois Challot, “ Deep learning with Python”, Manning, 2017.

5. Hugo Larochelle’s Video Lectures.

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS58/ SOFTWARE QUALITY ASSURANCE			
YEAR / SEMESTER	III / V			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To make the students understand the importance of quality in software development

COURSE OUTCOMES

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

- identify and determine the practices needed to manage a software system configuration.
- understands the mission of a quality system and knows the applicable standards and norms.
- understands the interrelation between product quality and process quality.
- knows and applies product and process quality control techniques.

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9HRS

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management

UNIT II MANAGING SOFTWARE QUALITY 9HRS

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9HRS

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT IV SOFTWARE QUALITY PROGRAM 9HRS

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9HRS

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's

Total Hours –45

TEXT BOOKS:

1. Abu SayedMahfuz, "Software Quality Assurance: Integrating Testing, Security, and Audit", CRC Press, Taylor and Francis Group, Auerbach Publications, ISBN 978-1-498-73553-7, 2016.

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition,Artech House Publishers 2007
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS59/ STATISTICS FOR MANAGEMENT**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVE:

To understand and communicate statistical findings, to learn to apply statistical tools to solve managerial questions, to learn to critically assess statistical designs and methods

COURSE OUTCOME:

Students will be able to think critically about the data arising in management environments, selecting the best tools to describe, analyze, and xploit this data for decision support.

UNIT I PROBABILITY -9HRS

Basic definitions and rules for probability, conditional probability, independent of events, Baye's Theorem, random variables, Probability distributions: Binomial, Poisson, Uniform and Normal Distributions.

UNIT II SAMPLING DISTRIBUTION AND ESTIMATION -9HRS

Introduction to sampling distributions, sampling techniques, sampling distribution of mean and proportion, application of central limit theorem. Estimation: Point and Interval estimates for population parameters of large sample and small samples, determining the sample size.

UNIT III TESTING OF HYPOTHESIS – 9HRS

Hypothesis testing: one sample and two samples tests for means and proportions of large samples (z-test), one sample and two sample tests for means of small samples (t-test), F-test for two sample standard deviations.

UNIT IV NON-PARAMETRIC METHODS -9HRS

Sign test for paired data. Rank sum test: Mann – Whitney U test and Kruskal Wallis test. One sample run test, Rank correlation. Chisquare tests for independence of attributes and goodness of fit.

UNIT V CORRELATION, REGRESSION AND TIME SERIES ANALYSIS -9HRS

Correlation analysis, estimation of regression line. Time series analysis: Variations in time series, trend analysis, cyclical variations, seasonal variations and irregular variations.

TOTAL HOURS-45

TEXT BOOKS:

1. Levin R.I. and Rubin D.S., "Statistics for management", 7th edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2001.

2. Aczel A.D. and Sounderpandian J., "Complete Business Statistics", 5th edition, Tata McGraw – Hill Publishing Company Ltd., New Delhi, 2009.

3. Anderson D.R., Sweeney D.J. and Williams T.A., "Statistics for business and economics", 8th edition, Thomson (South – Western) Asia Pte. Ltd., Singapore, 2010.

REFERENCE BOOKS:

1. Levine D.M., Krehbiel T.C. and Berenson M.L., "Business Statistics: A First Course", Pearson Education Asia, 2nd edition, New Delhi, 5 th Edition, 2009.

2. Hooda R.P., "Statistics for Business and Economics", 2nd edition, Macmillan India Ltd., 2010.

3. Morse L.B., "Statistics for Business and Economics", HarperCollins college Publishers, New York, 1994.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS60/ INFORMATION MANAGEMENT**			
YEAR / SEMESTER	**III / V**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To understand about Information Technology and Information systems, Functional Information systems, DBMS, Disaster Management, Data Mining and Cloud Computing.

COURSE OUTCOMES

Better usage of DSS, KMS, Data Warehousing, Intranets, Testing, E- Business, E – Governance.

UNIT I INTRODUCTION 9HRS

Data, Information, Intelligence, Information Technology, Information System, evolution, types based on functions and hierarchy, Functional Information Systems, DSS, EIS, KMS, GIS, International Information System.

UNIT II SYSTEMS ANALYSIS AND DESIGN -9HRS

Systems development methodologies, Systems Analysis and Design Tools – System flow chart, Decision table, DFD, ER, Object oriented Analysis and Design, UML diagram.

UNIT III DATABASE MANAGEMENT SYSTEMS – 9HRS

DBMS – HDBMS, NDBMS, RDBMS, OODBMS, Query Processing, SQL, Concurrency Management, Data warehousing and Data Mart

UNIT IV SECURITY, CONTROL AND REPORTING -9HRS

Security, Testing, Error detection, Controls, IS Vulnerability, Disaster Management, Computer Crimes, Securing the Web, Intranets and Wireless Networks, Software Audit, Ethics in IT, User Interface and reporting.

UNIT V NEW IT INITIATIVES -9HRS

Role of information management in ERP, e-business, egovernance, Data Mining, Business Intelligence, Pervasive Computing, Cloud computing, CMM.

TOTAL HOURS-45

TEXT BOOKS:

1. Robert Schultheis and Mary Summer, Management Information Systems – The Managers View, Tata McGraw Hill, 2008.

2. Kenneth C. Laudon and Jane Price Laudon, Management Information Systems – Managing the digital firm, PHI Learning / Pearson Education, PHI, Asia, 2002.

REFERENCE BOOKS:

1. Gordon Davis, Management Information System: Conceptual Foundations, Structure and Development, Tata McGraw Hill, 7 th edition, 2006.

2. Haag, Cummings and Mc Cubbrey, Management Information Systems for the Information Age, McGraw Hill, 2012.

3. Turban, McLean and Wetherbe, Information Technology for Management – Transforming Organisations in the Digital Economy, John Wiley, 6 th edition, 2009.

4. Raymond McLeod and Jr. George P. Schell, Management Information Systems, Pearson Education, 2007.

5. James O Brien, Management Information Systems – Managing Information Technology in the E-business enterprise, Tata McGraw Hill, 2010.

6. Corey Schou and Dan Shoemaker, Information Assurance for the Enterprise – A Roadmap to Information Security, Tata McGraw Hill, 2007.

7. Frederick Gallegor, Sandra Senft, Daniel P. Manson and Carol Gonzales, Information Technology Control and Audit, Auerbach Publications, 4 th edition, 2012.

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ELECTIVE COURSES-IV AND V

SEMESTER-VI

PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS62/ INTERNATIONAL BUSINESS MANAGEMENT**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVE:

Students become familiar with the theoretical background of international business. To understand the economic, cultural and ethical issues relating to international business.

COURSE OUTCOME:

Enable students to apply theory it in a variety of ways to varied international business situations, formulate frameworks for complex cross-border decision making

UNIT I INTRODUCTION – 9HRS

International Business –Definition – Internationalizing business Advantages –factors causing globalization of business- international business environment – country attractiveness – Political, economic and cultural environment – Protection Vs liberalization of global business environment.

UNIT II INTERNATIONAL TRADE AND INVESTMENT – 9HRS

Promotion of global business – the role of GATT/WTO – multilateral trade negotiation and agreements – VIII & IX, round discussions and agreements – Challenges for global business – global trade and investment – theories of international trade and theories of international investment – Need for global competitiveness – Regional trade block – Types – Advantages and disadvantages – RTBs across the globe – brief history.

UNIT III INTERNATIONAL STRATEGIC MANAGEMENT – 9HRS

Strategic compulsions Standardization Vs Differentiation – Strategic options – Global portfolio managementglobal entry strategy – different forms of international business –

advantages organizational issues of international business – organizational structures – controlling of international business – approaches to control – performance of global businessperformance evaluation system.

UNIT IV PRODUCTION, MARKETING, FINANCIAL AND HUMAN RESOURCE MANAGEMENT OF GLOBAL BUSINESS – 9HRS

Global production –Location –scale of operations- cost of production – Make or Buy decisions – global supply chain issues – Quality considerations- Globalization of markets, marketing strategy – Challenges in product development , pricing, production and channel management- Investment decisions – economic- Political risk – sources of fund- exchange –rate risk and management – strategic orientation – selection of expatriate managers- Training and development – compensation.

UNIT V CONFLICT MANAGEMENT AND ETHICS IN INTERNATIONAL BUSINESS MANAGEMENT – 9HRS

Disadvantages of international business – Conflict in international business- Sources and types of conflict – Conflict resolutions – Negotiation – the role of international agencies –Ethical issues in international business – Ethical decisionmaking.

TOTAL HOURS-45

TEXT BOOKS:

1. Charles W.I. Hill and Arun Kumar Jain, International Business, 6th edition, Tata Mc Graw Hill, 2009.

2. John D. Daniels and Lee H. Radebaugh, International Business, Pearson Education Asia, New Delhi, 13th editon, 2010.

3. K. Aswathappa, International Business, Tata Mc Graw Hill, 2008.

4. Michael R. Czinkota, Ilkka A. Ronkainen and Michael H. Moffet, International Business, Thomson, Bangalore, 8 th edition, 2009.

5. Aravind V. Phatak, Rabi S. Bhagat and Roger J. Kashlak, International Management, Tata Mc Graw Hill, 2 nd edition, 2008.

6. Oded Shenkar and Yaong Luo, International Business, John Wiley Inc, Noida, 2 nd edition, 2007.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS63/SOCIAL NETWORK ANALYTICS**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES:

- To understand the components of the social network.
- To model and visualize the social network.
- To mine the users in the social network.
- To understand the evolution of the social network.
- To know the applications in real time systems.

COURSE OUTCOMES:

Upon Completion of the course, the students should be able to

1. Work on the internals components of the social network
2. Model and visualize the social network
3. Mine the behaviour of the users in the social network
4. Predict the possible next outcome of the social network
5. Apply social network in real time applications

UNIT I SOCIAL NETWORK ANALYSIS 9HRS

Network analysis- Development of Social network analysis- Key concepts and measures in network analysis -The global structure of networks - The macro-structure of social networks - Personal networks..

UNIT II WEB SEMANTICS IN SOCIAL NETWORK APPLICATIONS 9HRS

Electronic sources for network analysis - Electronic discussion networks - Blogs and online communities - Web-based networks - Knowledge Representation on the Semantic Web - Ontologies and their role in the Semantic Web Ontology languages for the Semantic Web - The Resource Description Framework (RDF)and RDF Schema - The Web Ontology Language (OWL) - Comparison to the Unified Modelling Language (UML) - Comparison to the

Entity/Relationship (E/R) model and the relational model - Comparison to the Extensible Markup Language (XML) and XML Schema.

UNIT III MODELLING AND AGGREGATING SOCIAL NETWORK DATA 9HRS

State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Representing identity - On the notion of equality - Determining equality - Reasoning with instance equality - Evaluating smushing

UNIT IV DEVELOPING SOCIAL-SEMANTIC APPLICATIONS 9HRS

Building Semantic Web applications with social network features - The generic architecture of Semantic Web applications -Sesame – Elmo – GraphUtil - The features of Flink - System design – open academia: distributed, semantic-based publication management - The features of open academia - System design.

UNIT V EVALUATION OF SOCIAL NETWORK ANALYSIS 9HRS

Evaluation of web-based social network extraction - Data collection - Preparing the data – Optimizing goodness of fit - Comparison across methods and networks - Predicting the goodness of fit – Evaluation through analysis - Semantic-based Social Network Analysis in the sciences - Data acquisition - Representation, storage and reasoning- Visualization and Analysis – Results - Descriptive analysis - Structural and cognitive effects on scientific performance .

TOTAL :45 Hours

TEXT BOOKS

1. Peter Mika , Social Networks and the Semantics Web",Springer, 2007

REFERENCE BOOKS

1. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer,2010.

E-BOOK

1.http://www.asecib.ase.ro/mps/Social%20Networks%20and%20the%20Semantic%20Web%20[2007].pdf

MOOC

1. https://www.coursera.org/learn/social-network-analysis

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PROGRAM NAME	B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS			
COURSE CODE / NAME	UCSBS64/ CYBER FORENSIC ANALYTICS			
YEAR / SEMESTER	III / VI			
	L	T	P	C
	3	0	0	3

COURSE OBJECTIVE:

To learn the fundamentals of Computer forensics and Data Acquisition

•To understand the procedure for processing , analysis and validation of digital evidence

•To study the tools and techniques in File System Forensic analysis

•To gain knowledge on Multimedia forensics, malware analysis and mobile device forensics.

•To become familiar with software and hardware tools

•To learn the tools and techniques in Network and E-mail Forensics

COURSE OUTCOME:

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

1. Outline the Cyber crime and its types.
2. Explore the Cyber Forensics Techniques
3. Use the Cyber Investigation Techniques
4. Explore the Cyber Evidence Management Techniques

5.Outline the Cyber Laws in India

UNIT 1: CYBER CRIME (9HRS)

Cyber Space – Cyber Crime – Criminal Behaviour – Jurisdictional Concerns - Jurisprudential Inconsistency – eCash Security – Prepaid Cards – Stored Values Cards – Mobile Payments – Internet Payment Services - Cyber stalking - Cyber extortion – Cyber terrorism - Cyber warfare –Cyber weapons -ATM frauds – Phreaking – Internet Gambling

UNIT 2: CYBER FORENSICS (9HRS)

Digital device – Hard disk –Disk characteristics - Disk imaging - Data Carving – Techniques – commercial piracy - soft lifting – Steganography – Network components - Port scans - Wireshark - pcap analysis - Trojans and Backdoors – Botnets - DoS – DDoS Attacks - Honey

Pots – Malware – Virus and Worms

UNIT 3: CYBER INVESTIGATION (9HRS)

Concepts of Investigation - cyber investigation, Network Investigation - Investigating audit logs -Investigating Web attacks - Investigating Computer Intrusions - Profiling – Cyber Criminal profiling –Stylometric Techniques – Warranted searches – Warrantless searches – Undercover Techniques

UNIT 4: EVIDENCE MANAGEMENT (9HRS)

Evidence – Digital Evidence - Types – physical evidence – Real evidence – Circumstantial evidence –network evidence - Evidence collection – Evidence Analysis - Contextual Information –Evidence Management – pre search activities – On Scene activities – Report Preparations

UNIT 5: CYBER LAWS AND AUTHORITIES (9HRS)

Information Technology Act 2000 – Digital signature - Electronic Governance - Secure electronic records - Regulation of certifying authorities – CERNTin - Electronic signature certificates – Penalties compensation - Future Trends and Emerging Concerns

TOTAL :45 Hours

TEXT BOOKS

1.Marjie T. Britz, “Computer Forensics and Cyber Crime”, Pearson, 2013.

2. Garima Tiwari, “Understanding Laws– Cyber Laws And Cyber Crimes”, Lexis Nexis, 2014.

REFERENCE BOOKS

1. Chuck Easttom, Jeff Taylor, “Computer Crime, Investigation, and the Law”, Course Technology, 2018.

2. Eoghan Casey, “Digital Evidence and Computer Crime: Forensic Science, Computers, and the

Internet”, Eoghan Casey, 2018.

E-BOOK

1 http://index-of.es/Miscellanous/LIVRES/Syngress.Cyber.May.2014.ISBN.0128007435.pdf

2. http://index-of.es/Miscellanous/LIVRES/Syngress.Cyber.May.2014.ISBN.0128007435.pdf

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS65/ ENERGY HARVESTING TECHNOLOGIES AND POWER MANAGEMENT FOR IoT DEVICES**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

To learn the techniques in involved in Energy harvesting

COURSE OUTCOMES

1.Understand the various energy sources and energy harvesting based sensor networks

2. Learn about the various Piezoelectric materials and Non-linear techniques

3. Understand the various Power sources for WSN

4. Learn about the applications of Energy harvesting systems.

UNIT I – ENERGY HARVESTING SYSTEMS 9 hours

Introduction – Energy sources – energy harvesting based sensor networks – photovoltaic cell technologies – generation of electric power in semiconductor PV cells – types

UNIT II - PIEZO-ELECTRIC ENERGY HARVESTING AND ELECTROMECHANICAL MODELING 9 hours Piezoelectric materials – transducers – harvesters – microgenerators – strategies for enhancing the performance of energy harvesters. Electromechanical modeling of Lumped parameter model and coupled distributed parameter models and closed-form solutions

UNIT III- ELECTROMAGNETIC ENERGY HARVESTING AND NON-LINEAR TECHNIQUES 9 hours

Basic principles – micro fabricated coils and magnetic materials – scaling – power maximations – micro and macro scale implementations. Non-linear techniques – vibration control & steady state cases

UNIT IV- ENERGY HARVESTING WIRELESS SENSORS 9 hours

Power sources for WSN – Power generation – conversion – examples – case studies.

Harvesting micro electronic circuits – power conditioning and losses

UNIT V - SELECTED APPLICATIONS OF ENERGY HARVESTING SYSTEMS 9 hours

Case studies for Implanted medical devices – Bio-MEMS based applications – harvesting for RF sensors and ID tags – powering wireless SHM sensor nodes

TOTAL-45 HOURS

REFERENCES

1. Carlos Manuel Ferreira Carvalho, Nuno Filipe Silva VeríssimoPaulino, "CMOS Indoor Light Energy Harvesting System for Wireless Sensing Applications", springer

2. Danick Briand, Eric Yeatman, Shad Roundy ,"Micro Energy Harvesting"

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS66/ ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

i. To study the idea of intelligent agents and search methods.
ii. To study about representing knowledge.
iii. To study the reasoning and decision making in uncertain world.
iv. To construct plans and methods for generating knowledge.
v. To study the concepts of expert systems.

COURSE OUTCOMES

Upon successful completion of this subject students should be able to:

1. Develop the skills to gain a basic understanding of neural network theory and artificial Intelligence theory.
2. Explore the functional components of neural network classifiers and the functional components of artificial intelligence classifiers.
3. Develop and implement a basic trainable neural network or an artificial Intelligence system for a typical biomedical application.
4. Describe, apply, and implement uninformed and informed search techniques to solve problems.
5. Independently investigate an AI technique and describe, apply, and implement that technique.

UNIT1. INTRODUCTION 9HRS

Introduction to AI: Intelligent agents – Perception – Natural language processing – Problem – Solving agents – Searching for solutions: Uniformed search strategies – Informed search strategies.

UNIT 2. KNOWLEDGE AND REASONING 9HRS

Adversarial search – Optimal and imperfect decisions – Alpha, Beta pruning – Logical agents: Propositional logic – First order logic – Syntax and semantics – Using first order logic – Inference in first order logic.

UNIT 3. UNCERTAIN KNOWLEDGE AND REASONING 9HRS

Uncertainty – Acting under uncertainty – Basic probability notation – Axioms of probability – Baye's rule – Probabilistic reasoning – Making simple decisions.

UNIT 4. PLANNING AND LEARNING 9HRS

Planning: Planning problem – Partial order planning – Planning and acting in non-deterministic domains – Learning: Learning decision trees – Knowledge in learning – Neural networks – Reinforcement learning – Passive and active.

UNIT 5. EXPERT SYSTEMS 9HRS

Definition – Features of an expert system – Organization – Characteristics – Prospector – Knowledge Representation in expert systems – Expert system tools – MYCIN – EMYCIN.

Total = 45HOURS

TEXT BOOKS

1. Stuart Russel and Peter Norvig, 'Artificial Intelligence A Modern Approach', Second Edition, Pearson Education, 2003 / PHI.

2. Donald A.Waterman, 'A Guide to Expert Systems', Pearson Education.

REFERENCE BOOKS

1. George F.Luger, 'Artificial Intelligence – Structures and Strategies for Complex Problem Solving', Fourth Edition, Pearson Education, 2002.

2. Elain Rich and Kevin Knight, 'Artificial Intelligence', Second Edition Tata McGraw Hill, 1995.

3. Janakiraman, K.Sarukesi, 'Foundations of Artificial Intelligence and Expert Systems', Macmillan Series in Computer Science.

4. W. Patterson, 'Introduction to Artificial Intelligence and Expert Systems', Prentice Hall of India, 2003.

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS67/ WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the details of web services technologies like WSDL, UDDI, SOAP
- To learn how to implement and deploy web service client and server
- To explore interoperability between different frameworks

COURSE OUTCOMES

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

UNIT - I Evolution and Emergence of Web Services 9HRS

- Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services. Web Services Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

UNIT - II Fundamentals of SOAP –9HRS

SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, Java and Axis, limitations of SOAP.

UNIT - III Describing Web Services –9HRS

WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

UNIT - IV Discovering Web Services – 9HRS

Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDDI.

UNIT - V Web Services Interoperability – 9HRS

Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, creating Java client for a Web service, Challenges in Web Services Interoperability. Web Services Security – XML security frame work, Goals of Cryptography, Digital signature, Digital Certificate, XML Encryption.

TOTAL -45 HOURS

TEXT BOOK:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

REFERENCE BOOKS:

1. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier

2. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn.

3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD. 4. Web Services, G. Alonso, F. Casati and others, Springer

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS68/ MOBILE AND PERVASIVE COMPUTING**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

- To understand the basics of Mobile computing and Personal computing.
- To learn the role of wireless networks in Mobile Computing and Pervasive Computing.
- To study about the underlying wireless networks.
- To understand the architectures of mobile and pervasive applications.
- To become familiar with the pervasive devices and mobile computing platforms.

COURSE OUTCOMES

At the end of the course the student should be able to,

- To deploy 3G networks
- To develop suitable algorithms for 4G networks.
- To use sensor and mesh networks to develop mobile computing environment.
- To develop mobile computing applications based on the paradigm of context aware computing

UNIT I INTRODUCTION 9HRS

Differences between Mobile Communication and Mobile Computing – Contexts and Names – Functions – Applications and Services – New Applications – Making Legacy Applications Mobile Enabled – Design Considerations – Integration of Wireless and Wired Networks – Standards Bodies – Pervasive Computing – Basics and Vision – Principles of Pervasive Computing – Categories of Pervasive Devices

UNIT II 3G AND 4G CELLULAR NETWORKS 9HRS

Migration to 3G Networks – IMT 2000 and UMTS – UMTS Architecture – User Equipment – Radio Network Subsystem – UTRAN – Node B – RNC functions – USIM – Protocol Stack – CS and PS Domains – IMS Architecture – Handover – 3.5G and 3.9G a brief discussion – 4G LAN and Cellular Networks – LTE – Control Plane – NAS and RRC – User Plane – PDCP,

RLC and MAC – WiMax IEEE 802.16d/e – WiMax Internetworking with 3GPP

UNIT III SENSOR AND MESH NETWORKS 9HRS

Sensor Networks – Role in Pervasive Computing – In Network Processing and Data Dissemination – Sensor Databases – Data Management in Wireless Mobile Environments – Wireless Mesh Networks – Architecture – Mesh Routers – Mesh Clients – Routing – Cross Layer Approach – Security Aspects of Various Layers in WMN – Applications of Sensor and Mesh networks

UNIT IV CONTEXT AWARE COMPUTING 9HRS

Adaptability – Mechanisms for Adaptation - Functionality and Data – Transcoding – Location Aware Computing – Location Representation – Localization Techniques – Triangulation and Scene Analysis – Delaunay Triangulation and Voronoi graphs – Types of Context – Role of Mobile Middleware – Adaptation and Agents – Service Discovery Middleware

UNIT V APPLICATION DEVELOPMENT 9HRS

Three tier architecture - Model View Controller Architecture - Memory Management – Information Access Devices – PDAs and Smart Phones – Smart Cards and Embedded Controls – J2ME – Programming for CLDC – GUI in MIDP – Application Development ON Android and iPhone.

TOTAL: 45 PERIODS

REFERENCES:

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, “Mobile Computing: Technology, Applications and Service Creation”, Second Edition, Tata McGraw Hill, 2010.

2. Reto Meier, “Professional Android 2 Application Development”, Wrox Wiley, 2010.

3. .Pei Zheng and Lionel M Li, ‘Smart Phone & Next Generation Mobile Computing’, Morgan Kaufmann Publishers, 2006.

4. Frank Adelstein, ‘Fundamentals of Mobile and Pervasive Computing’, TMH, 2005

5. Jochen Burthardt et al, ‘Pervasive Computing: Technology and Architecture of Mobile Internet Applications’, Pearson Education, 2003

6. Feng Zhao and Leonidas Guibas, ‘Wireless Sensor Networks’, Morgan Kaufmann Publishers, 2004

7. Uwe Hansmaan et al, 'Principles of Mobile Computing', Springer, 2003

8. Reto Meier, "Professional Android 2 Application Development", Wrox Wiley, 2010.

9. Stefan Poslad, "Ubiquitous Computing: Smart Devices, Environments and Interactions",

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PROGRAM NAME	**B.SC- COMPUTER SCIENCE AND BUSINESS SYSTEMS**			
COURSE CODE / NAME	**UCSBS69/ IMAGE PROCESSING AND PATTERN RECOGNITION**			
YEAR / SEMESTER	**III / VI**			
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

COURSE OBJECTIVES

1. imparts knowledge in the area of image and image processing
2. understand fundamentals of digital image processing
3. provide knowledge of the applications of the theories taught in Digital Image Processing
4. learn the fundamentals of Pattern recognition and to choose an appropriate feature
5. classification algorithm for a pattern recognition problems and apply them properly using modern computing tools such as Matlab, C/C++ etc.

COURSE OUTCOMES

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

1. understand Basics of Image formation and transformation using sampling and quantization
2. understand different types signal processing techniques used for image sharpening and smoothing
3. perform and apply compression and coding techniques used for image data
4. understand the nature and inherent difficulties of the pattern recognition problems
5. understand concepts, trade-offs, and appropriateness of the different feature types and classification techniques such as Bayesian, maximum-likelihood, etc
6. select a suitable classification process, features, and proper classifier to address a desired pattern recognition problem.

Unit I: Introduction to Image Processing 9HRS

Image formation, image geometry perspective and other transformation, stereo imaging

elements of visual perception. Digital Image-sampling and quantization serial & parallel Image processing.

Unit II: Image Restoration 9HRS

Image Restoration-Constrained and unconstrained restoration Wiener filter , motion blur remover, geometric and radiometric correction Image data compression-Huffman and other codes transform compression, predictive compression two tone Image compression, block coding, run length coding, and contour coding.

Unit III: Segmentation Techniques 9HRS

Segmentation Techniques-thresh holding approaches, region growing, relaxation, line and edge detection approaches, edge linking, supervised and unsupervised classification techniques, remotely sensed image analysis and applications, Shape Analysis – Gestalt principles, shape number, moment Fourier and other shape descriptors, Skelton detection, Hough trans-form, topological and texture analysis, shape matching.

Unit IV: Pattern Recognition 9HRS

Basics of pattern recognition, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Unit V: Statistical Patten Recognition 9HRS

Bayesian Decision Theory, Classifiers, Normal density and discriminant functions, Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods – Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM),Gaussian mixture models.

TOTAL -45 HOURS

TEXT BOOKS

1. Digital Image Processing – Ganzalez and Wood, Addison Wesley, 1993.
2. Fundamental of Image Processing – Anil K.Jain, Prentice Hall of India.
3. Pattern Classification – R.O. Duda, P.E. Hart and D.G. Stork, Second Edition John Wiley,

2006

REFERENCE BOOKS

1. Digital Picture Processing – Rosenfeld and Kak, vol.I & vol.II, Academic,1982
2. Computer Vision – Ballard and Brown, Prentice Hall, 1982
3. An Introduction to Digital Image Processing – Wayne N`iblack, Prentice Hall, 1986
4. Pattern Recognition and Machine Learning – C. M. Bishop, Springer, 2009.
5. Pattern Recognition – S. Theodoridis and K. Koutroumbas, 4th Edition, Academic Press,2009