Program Syllabus Booklet

Master of Computer Applications

(MCA-301)

Session: 2018-19

University College of Computer Applications
Guru Kashi University, Talwandi Sabo

GURU KASHI UNIVERSITY
PUNJAB - INDIA

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Annexure -1

Program Name: Master of Computer Applications (MCA)

Program Code: 301

The Program Outcomes (POs): The PO for the Master of Computer Applications (MCA) is as follows:

PO	Statement
PO1	**Computational knowledge:** To understand and apply mathematical foundation, computing knowledge for the conceptualization of computing models from defined problems.
PO2	**Problem analysis:** To ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
PO3	**Design/development of solutions:** To ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies
PO4	**Conduct investigations of complex Computing problems**: To ability to devise and conduct experiments, interpret data and provide well informed conclusions.
PO5	**Modern tool usage:** To ability to select modern computing tools, skills and techniques necessary for innovative software solutions.
PO6	**Societal & Environmental Concern:** To ability to recognize economical, environmental, social, health, legal, ethical issues involved in the use of computer technology and other consequential responsibilities relevant to professional practice.
PO7	**Environment and sustainability:** To understand the impact of the professional programmer solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** To apply ethical principles and commit to professional ethics and responsibilities and norms of the computer practice.
PO9	**Individual and team work:** To function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** To communicate effectively on complex Computer activities with the Computer community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11	**Project management and finance:** To demonstrate knowledge and understanding of the programmer and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** To recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The Program Specific Outcomes (PSOs): The PSO for the Master of Computer Applications (MCA) are as follows:

PSO	Statement
PSO1	To solve real-world computing problems of various businesses by understanding principles of mathematics, computing techniques and other related disciplines to meet customer's business objectives.
PSO2	To pursue careers in IT industry, research and development, teaching and areas related to computer science & applications.
PSO3	To analyze the societal needs to provide novel solutions through technological based research.

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Annexure-2

Semester: 1st										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301101	Communication Skills	T	4	1	0	5	50	50	100
2	A301102	Digital Electronics & Circuit Design	T	4	1	0	5	50	50	100
3	A301103	Programming & Problem Solving in C	T	4	1	0	5	50	50	100
4	A301104	Foundations of Information Technology	T	4	1	0	5	50	50	100
5	A301105	Numerical Methods & Statistical Techniques	T	4	1	0	5	50	50	100
6	A301106	Software Lab-I (Information Technology)	P	0	0	4	2	60	40	100
7	A301107	Software Lab-II (C Language)	P	0	0	6	3	60	40	100
Total No. of Credits				30						

Semester: 2nd										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301201	Microprocessors and its Applications	T	4	1	0	5	50	50	100
2	A301202	Distributed Computer Systems	T	4	1	0	5	50	50	100
3	A301203	Data Structures & Analysis of Computer Algorithms	T	4	1	0	5	50	50	100
4	A301204	Multimedia & Web Designing	T	4	1	0	5	50	50	100
5	A301205	Principles of Management Functions & Organizational Behaviour	T	4	1	0	5	50	50	100
6	A301206	S/w Lab-III(Data Structure using C/C++)	P	0	0	6	3	60	40	100
7	A301207	S/w Lab-IV(Web Designing)	P	0	0	4	2	60	40	100
Total No. of Credits				30						

Semester: 3rd										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301301	Advanced Database Management System	T	4	1	0	5	50	50	100
2	A301302	Operating Systems	T	4	1	0	5	50	50	100
3	A301303	Object Oriented Analysis , Design & C++	T	4	1	0	5	50	50	100
4	A301304	Discrete Mathematics	T	4	1	0	5	50	50	100
5	A301305	Computer Organization and Architecture	T	4	1	0	5	50	50	100
6	A301306	Software Lab-V (C++)	P	0	0	6	3	60	40	100
7	A301307	Software Lab-VI (Advanced Database Management System)	P	0	0	4	2	60	40	100
Total No. of Credits				30						

Semester: 4th										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301401	Computer Based Optimization Techniques	T	4	1	0	5	50	50	100
2	A301402	Object Oriented Technologies and Java Programming	T	4	1	0	5	50	50	100
3	301412	Advanced Data Structure	T	4	1	0	5	50	50	100
4		**Elective-I**	T	4	0	0	4	50	50	100
5	A301405	Theory of Computation	T	4	1	0	5	50	50	100
6	A301406	S/w Lab-VII(Java Programming)	P	0	0	6	3	60	40	100
7	301413	Advanced Data Structure Lab	P	0	0	6	3	60	40	100
Total No. of Credits				30						

Elective-I (Select one of the following subjects)		
S.No	**Subject Code**	**Subject Name**
1	301408	Data Mining
2	301409	Soft Computing
3	301410	Machine Learning
4	301411	Artificial Intelligence

Semester: 5th										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301501	Computer Graphics and Multimedia	T	3	1	0	4	50	50	100
2	A301502	Data Communication & Computer Networks	T	4	1	0	5	50	50	100
3	A301503	System Software	T	4	1	0	5	50	50	100
4	301509	Programming using Python	T	4	1	0	5	50	50	100
5	A301403	Software Engineering	T	4	1	0	5	50	50	100
6	A301407	Workshop on PHP	P	0	0	4	2	60	40	100
7	301510	Software Lab (Programming using Python)	P	0	0	8	4	60	40	100
Total No. of Credits				30						

Semester: 6th										
Sr.	Subject Code	Subject Name	Type of Subject T/P	(Hours Per Week)			No. of Credits	Internal Marks	External Marks	Total Marks
				L	T	P				
1	A301601	Industrial Training/Internship (6 Months)	NA	NA	NA	NA	20	500	500	1000
Total No. of Credits				20						

Annexure-3

Course Name: Communication Skills

Course Code: -A301101

Semester: 1st

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand an overview of prerequisites to Business Communication and awareness of appropriate communication strategies.
CO2	Grasp an outline for effective Organizational Communication.
CO3	Summarize information, ideas, concepts and opinions from a variety of sources.
CO4	Classify the competence in oral, written, and visual communication.
CO5	Impart the correct practices about the strategies of Effective Business writing.

Course Contents

Section A

Writing and Speaking English: Parts of Speech, Resume Writing, Business Letters Vowels, Diphthongs, Consonants, Consonant Clusters, Stress, Syllable, Syllabic

The Art of Communication: Verbal Communication: Effective Communication, Effective/Active listening paraphrasing, Feedback Non Verbal Communication: Personality Enhancement, Body Language

The Hidden Data of Communication : The importance of feelings in communication, dealing with feelings, The importance of developing assertive skills, developing self-confidence, developing Emotional Intelligence, Dealing with People,

Section B

Group Activities and World of Teams: Importance of Team work, working with Groups, Group Discussions, Group Decision-making

Getting Ready for Interviews: Corporate Dressing, Business Etiquettes, Media Etiquettes, Table Etiquettes

Ethical Orientation: Ethical Dilemmas and Choices

Text Books:

1. Strategic interviewing. *Richard Camp, Mary E. Vielhaber and Jack L. Simonetti*. Wiley India Pvt. Ltd

2. Essentials of Effective Communication. *Ludlow and Panthon*. Prentice Hall of India.
3. Spoken English. *V Sasikumar and PV Dhamija*. Tata Mc Graw Hill
4. Developing Communication Skills. *Krishna Mohan and Meera Banerji*. MacMillan India Ltd., Delhi
5. Communication Skills. *Ms. R. Datta Roy and K K Dhir*. Vishal Publications, Jalandhar.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	2	1	1	1	1	-	-	2	3	3	3	3	3	2
CO2	2	2	2	2	3	3	-	1	3	3	3	3	2	3	2
CO3	2	2	2	1	2	2	-	-	2	3	3	1	2	2	2
CO4	2	1	2	3	2	1	1	-	3	3	3	2	2	2	2
CO5	3	1	3	2	2	2	-	-	2	3	3	1	1	2	3
Average	2.2	1.6	2.0	1.8	2.0	1.8	1	1	2.4	3	3	2.0	2.0	2.4	2.2

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Digital Electronics & Circuit Design

Course Code: - A301102

Semester: 1st

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Classify the fundamental concepts and techniques used in digital electronics.
CO2	Apply the structure of various number systems and its applications.
CO3	Analyze and design various combinational and sequential circuits.
CO4	Summarize the basic requirements for designing an application.
CO5	Understand the various hazards in a digital design.

Course Contents

Section A

Number Systems and Binary Code: Introduction of analog and digital signals , binary, octal and hexadecimal number system, signed and unsigned number, arithmetic operations-addition, subtraction, multiplication and division of binary, octal and hexadecimal number systems, conversions of number systems, 1's complement, 2's complement, 9's complement and 10's complement, BCD code, ASCII code, excess 3 code, gray code.

Minimization of Logic Function: OR, AND,NOT,NOR,NAND,EX-OR operations and gates, boolean theorems, De-Morgan's theorem, SOP and POS, canonical form, minimization using theorems, K-map and Q-M method, completely specified functions.

Section B

Combinational Logic Circuits: Introduction, combinational circuit design, multiplexers, demultiplexer, encoders, decoders, adders, subtractor, code converters, parity checker, parity generator, BCD display drive, magnitude comparators.

Sequential Circuits: Introduction, flip-flops: R, S, J, K and T flip flop using nand gates and their conversions, shift registers.

D/A and A/D Converters: Introduction, weighted register D/A converter, binary ladder D/A converter, parallel A/D converter, counter type A/D converter, successive approximation A/D converter, single and dual slope A/D converter, specifications of ADC&DAC.

Text / References:

1. Digital principle and applications . *Malvino.* Tata Mc Graw Hills.
2. Modern digital electronics. *R. P. Jain*. Prentice Hall of India.
3. Digital Design. *M.M.Mano.* Prentice Hall of India.
4. An Engineering Approach to Digital Design. *William I. Fletcher*. Prentice Hall of India Pvt. Ltd., NEW Delhi.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	2	2	3	3	2	3	1
CO2	2	2	2	1	3	2	1	1	2	2	3	3	1	2	3
CO3	2	2	1	2	2	2	3	2	1	3	3	3	3	1	2
CO4	3	2	1	1	3	2	-	1	2	2	3	2	1	3	1
CO5	2	2	3	3	3	1	-	1	2	2	3	2	3	2	2
Average	**2.4**	**2**	**2**	**1.8**	**2.8**	**1.8**	**2**	**1.2**	**1.8**	**2.2**	**3**	**2.6**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Programming & Problem Solving in C

Course Code: A301103

Semester: 1st

L T P

Credits: 04 **3 1 0**

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

CO	Statement
CO1	Impart the working of a digital computer.
CO2	Classify the functioning of computer components.
CO3	Grasp the concepts of Programming.
CO4	Recognize the various types of statements.
CO5	Write a C program for a given algorithm.

Course Contents

Unit - I

Introduction: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program, Programming rules, Execution

Basic structure of C program: Character set, Identifiers and keywords, constants, variable, Data types, input and output, type conversion,

Operators and expressions: Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators, type conversion. Library functions.

Unit - II

Input/ Output in C: Formatting input & output functions.

Decision making statements – if, else if

Control statements: branching, looping using For, While and Do-While statements, nested control structures, switch, break and continue statements.

Unit - III

Arrays: Definition, declaration, assignment, one dimensional and two dimensional arrays.

Strings: input/output of strings, string handling functions, table of strings.

Pointers: pointer data type, pointer declaration, initialization, accessing values using pointers. **Functions:** prototype, definition and call, formal and actual arguments, methods of parameter passing to functions, recursion versus iteration.

Unit – IV

Structures and unions: using structures and unions, comparison of structure with arrays and

Union.

Files: opening and closing files, Basic I/O operation on files.

Storage Classes: automatic, external, static and register variables.

Text Book:

1. Kanetkar P. Yashvant. *Let us C*. Seventh Edition. BPB Publications, New Delhi.
2. Balagurusamy E. *Programming in C***.** Tata Mc Graw Hill.
3. G.S. Byron. *Programming in C*, Second Edition. Mc Graw Hills.
4. Kernighan & Richie. *The C Programming Language*, Second Edition,.PHI.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	3	-	0	2	2	3	2	1	2	1
CO2	2	2	2	2	3	1	-		3	2	3	3	2	2	3
CO3	3	2	3	3	3	2	1	-	2	2	2	2	2	2	3
CO4	3	2	2	2	2	3	-	1	3	2	3	3	3	2	2
CO5	3	2	2	3	3	2	-	-	2	1	2	2	3	3	3
Average	**2.6**	**2.2**	**2.0**	**2.4**	**2.6**	**2.2**	**1**	**1**	**2.4**	**1.8**	**2.6**	**2.4**	**2.2**	**2.4**	**2.4**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Human Value And Ethics

Course Code: A301104

Semester: 1st

L T P

Credits: 04 **3 1 0**

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

CO	Statement
CO1	Understand the core values of ethical behavior of an engineer.
CO2	Get knowledge about awareness on professional ethics and human values.
CO3	Inculcate work ethics into the young minds.
CO4	Develop respect and confidence among their profession.
CO5	Create ethical vision and achieve harmony in life.

Course Contents

Unit - I

Human Values: Morals, Values and Ethics - Integrity - Work Ethic - Service Learning - Civic Virtue - Respect for Others - Living Peacefully - caring - Sharing - Honesty - Courage - Valuing Time - Co-operation - Commitment - Empathy - Self-Confidence - Character – Spirituality.

Unit - II

Engineering Ethics: Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry- moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy - Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

Unit – III

Engineering as Social Experimentation: Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study.

Unit – IV

Safety, Responsibilities and Rights: Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the Three Mile Island and Chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality -

conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger. *Ethics in Engineering***.** McGraw-Hill, New York, 1996.

2. Govindarajan M, Natarajan S, Senthil Kumar V. S. *Engineering Ethics***.** Prentice Hall of India, New Delhi, 2004.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	1	1	1	2	1	1	2	2	3	3	3	3	3	2
CO2	3	2	1	2	3	3	-	2	3	2	1	3	1	3	2
CO3	1	2	1	1	1	1	-	2	2	2	2	3	2	1	2
CO4	3	1	3	1	2	1	1	3	3	2	1	2	2	2	2
CO5	1	1	1	1	1	1	-	2	2	3	1	2	2	2	3
Average	**2.2**	**1.4**	**1.4**	**1.2**	**1.8**	**1.4**	**1**	**2.2**	**2.4**	**2.4**	**1.6**	**2.6**	**2.0**	**2.2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Numerical Method & Statistical Techniques

Course Code: - A301105

Semester: 1st

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Formulate the concepts of mean, median, mode and other measures of central tendency.
CO2	Summarize the standard deviation and other measures of dispersion.
CO3	Understand the concept of moments, skewness and kurtosis.
CO4	Impart the correct practices of statistical decision theory and test of hypotheses.
CO5	Grasp an outline on multiple and partial correlation.

Course Contents

Section A

INTRODUCTION TO STATISTICS: Meaning, scope, collection, classification of data, frequency distributions

THE MEAN, MEDIAN, MODE AND OTHER MEASURES OF CENTRAL TENDENCY: Index or subscript notation. Summation notation. Averages and Measures of central tendency. The arithmetic mean. Weighted arithmetic mean. Properties of the arithmetic mean. Arithmetic, mean computed from grouped data. Empirical relation between mean, median and mode. The geometric mean. The harmonic mean. Relation between arithmetic, Geometric, and harmonic means. The root mean square (r m s) Quartiles, deciles and percentiles.

THE STANDARD DEVIATION AND OTHER MEASURES OF DISPERSION: Dispersion or variation. The range. The mean deviation or average deviation. The semi-inter-quartile range or quartile deviation. The 10-90 percentile range. The standard deviation. The variance. Short methods for computing the standard deviation. Properties of the standard deviation. Charlier's check. Sheppard's correction for variance. Empirical relations between measures of dispersion. Absolute and relative dispersion. Coefficient of variation. Standardized variable, standard scores.

MOMENTS, SKEWNESS AND KURTOSIS: Moments. Moments for grouped data. Relation between moments. Computation of moments for grouped data. Charlier's check and Sheppard's corrections. Moments in dimensionless form Skew ness. Kurtosis. Population moments, skewness and kurtosis.

ELEMENTARY PROBABILITY THEORY: Classical definition of probability. Relative frequency definition of probability. Conditional probability. Independent and dependent events. Mutually exclusive events. Discrete probability distributions. Continuous probability distributions. Mathematical expectation. Relation between population and sample mean and variance. Combinatorial analysis. Fundamental principle. Factorial a Permutations. Combinations. Stirling's approximation to n! Relation of probability to point set theory.

THE BINOMIAL, NORMAL AND POISSON DISTRIBUTIONS: The binomial distribution. Some properties of the binomial distribution. The normal distribution. Some properties of the normal distribution. Relation between binomial and normal distributions. The Poisson distribution. Some properties of the Poisson distribution. Relation Between binomial and Poisson

distributions. The multinomial distribution. Fitting theoretical distributions to sample frequency distributions.

ELEMENTARY SAMPLING THEORY: Sampling theory. Random samples. Random numbers. Sampling with and without replacement. Sampling distributions. Sampling of means. Sampling distribution of proportions. Sampling distribution of differences and sums. Standard errors.

Section B

STATISTICAL ESTIMATION THEORY: Estimation of parameters. Unbiased estimates. Efficient estimates. Point estimates and interval estimate. Reliability. Confidence interval estimates of population parameters. Confidence interval estimates for means. Confidence intervals for proportions. Confidence intervals for differences and sums. Confidence intervals for standard deviations. Probable error.

STATISTICAL DECISION THEORY, TESTS OF HYPOTHESES AND SIGNIFICANCE: Statistical decisions. Statistical hypotheses. Null hypotheses. Tests of hypotheses and significance. Type I and type II errors. Level of significance. Tests involving the normal distribution. One tailed and two-tailed tests. Special tests. Operating characteristic curves. Power of a test. Control charts. Tests of significance involving sample differences. Tests involving the binomial distribution.

SMALL SAMPLING THEORY: Small samples "Student's" t distribution. Confidence intervals. Tests of hypotheses and significance. The chi-square distribution. Confidence intervals for χ^2 . Degree of freedom.

THE CHI-SQUARE TEST: Observed and Theoretical Frequencies. Definition of χ^2. Significance Tests. The χ^2 tests for Goodness of fit, Contingency Tables, Yate's Correction for Continuity, Simple Formulae for Computing χ^2. Coefficient of Contingency, Correlation of Attribute, Additive Property of χ^2.

CURVE FITTING AND THE METHOD OF LEAST SQUARE: Relationship between Variables, Curve Fitting, Equation of Approximating Curves, Freehand method of Curve Fitting, The Straight Line, The Method of Least Squares, The Least Square Line, Non Linear Relationships, The Least Square Parabola, Regression, Applications to Time Series, Problem Solving involving More than Two Variables.

CORRELATION TEHORY: Correlation and Regression, Linear Correlation, Measures of Correlation, The Least Square Regression Lines, Standard Error of Estimate, Explained and Unexplained Variation, Coefficient of Correlation, Remarks Concerning the Coefficient of Correlation, Product Moment Formula for the Linear Correlation Coefficient, Short Computational Formulae, Regression Lines and Linear Correlation Coefficient, Rank Correlation, Correlation of the Time Series, Correlation of Attributes, Sampling Theory of Correlation, Sampling Theory of Regression.

MULTIPLE AND PARTIAL CORRELATION: Multiple Correlation, Subscript Notation, Regression Equation, Regression Plane, Normal Equations for the Least Square Regression Plane, Regression Planes and Correlation Coefficients, Standard Error of Estimate, The Coefficient of Multiple Correlation, Change of Dependent Variable, Generalizations to More than Three Variables, Partial Correlation, Relationships Between Multiple and Partial Correlation Coefficients, Non-Linear Regression.

Text Books:

1. Murray R. Speigel, R. W. Boxer. *Theory and Problems of Statistics in SI units*. Schaums' outline Series, McGraw-Hill Book Company.

2. S.C. Gupta. *Fundamentals of Statistics*.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	2	2	3	3	2	3	1
CO2	2	2	2	1	3	2	1	1	2	2	3	3	1	2	3
CO3	2	2	1	2	2	2	3	2	1	3	3	3	3	1	2
CO4	3	2	1	1	3	2	-	1	2	2	3	2	1	3	1
CO5	2	2	3	3	3	1	-	1	2	2	3	2	3	2	2
Average	**2.4**	**2**	**2**	**1.8**	**2.8**	**1.8**	**2**	**1.2**	**1.8**	**2.2**	**3**	**2.6**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Software Lab-I (Information Technology)

Course Code: -A301106

Semester: 1st

L T P

Credits: 02 **0 0 4**

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

CO	Statement
CO1	Compose, format and edit a word document.
CO2	Send email messages (with or without attachments).
CO3	Understand the navigation and research through the internet.
CO4	Utilize the MS Power point.
CO5	Categorize programs, system software and applications.

Course Contents

List of Practical:-

Practical1. Introducing Office Suite and its Components; Introduction to OpenOffice.org Writer and its environment

Practical2. Creating, Opening, Editing and Saving a Document. PC with OpenOffice.org Not Applicable

Practical3. Selecting and Formatting Text in a Document.

Practical4. Page Setup and Printing a Document.

Practical5. Finding and Replacing Text occurrences in a Document.

Practical6. Bullets and Numbering.

Practical7. Spelling & Grammar Check, Thesaurus and Autocorrect Options.

Practical8. Inserting Images and other objects in a Document.

Practical9. Creating Hyperlinks and Bookmarks in a Document.

Practical10. Creating and Manipulating Tables in a Document.

Practical11. Merging Documents together; Implementing Mail Merge.

Practical12. Introducing Spread-sheet Package; Introduction to OpenOffice.org Calc and its environment.

Practical13. Entering & editing data in a spread-sheet; Opening, editing and saving workbooks.

Practical14. Inserting, Deleting, Moving, Copying and Renaming worksheets.

Practical15. Manipulation Rows and Columns in a worksheet; Using Fill Series.

Practical16. Cell Naming & Referencing (Absolute & Relative); Basic built-in Mathematical Functions.

Practical17. Basic built-in Date-Time Functions.

Practical18. Basic built-in Logical Functions.

Practical19. Page Setup and Printing spread-sheets

Practical20. Inserting Graphs/Charts in worksheets.

Practical21. Formatting Cells and Conditional Formatting.

Practical22. Protecting Worksheets and cells; Data Validation.

Practical23. Data Sorting and Filtering.

Practical24. Defining & Using Macros for automation of operations

Practical25. Introducing Presentation Packages; Introduction to OpenOffice.org Impress and its

environment.

Practical26.Creating, Opening & Saving a presentation; Inserting, Deleting and Ordering slides in a presentation.

Practical27. Formatting Slides; Different Views of a presentation.

Practical28. Using Auto-content Wizard & Templates.

Practical29. Inserting Graphs/Charts, images, auto-shapes and audio/video clips in a presentation.

Practical30. Managing Slide-shows: Custom Animation & Slide- Transition Effects

Practical31. Rehearse Timings; Printing Slides and Hand-outs.

Practical32. Using Web Browsers to surf the internet and the WWW; Using Email, Chat (IRC) and Search Engines (Spiders/Web Directories)

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	3	-	-	2	2	3	3	3	1	3
CO2	1	3	2	3	3	1	-	-	3	2	2	3	2	2	1
CO3	3	1	3	2	3	2	-	1	2	2	2	2	2	2	3
CO4	3	2	2	2	2	3	1	-	3	2	2	2	3	1	2
CO5	3	2	2	2	3	3	-	-	2	2	2	2	3	3	3
Average	**2.4**	**2.2**	**2.0**	**2.4**	**2.6**	**2.4**	**1**	**1**	**2.4**	**2.0**	**2.2**	**2.4**	**2.6**	**1.8**	**2.4**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Software Lab-II (C Language)

Course Code: -301107

Semester: 1st

L T P

Credits: 03 **0 0 6**

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

CO	Statement
CO1	Impart the difference between the top-down and bottom-up approach.
CO2	Develop a given program using the basic elements like control statements.
CO3	Debug a given Program.
CO4	Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.
CO5	Analyze an algorithmic solution for a given problem.

Course Contents

Program 1. Program of Basics of C Language

Program 2. Program of Data Types PCs

Program 3. Program of Storage classes.

Program 4. Program of Declarations

Program 5. Program of Type Conversions, Operators, operator precedence & Associatively

Program 6. Program of if statement, if-else statement, Logical operators, Conditional operators

Program 7. Program of Decision Control.

Program8. Program of while, for, break, continue, do-while, Nesting of loops

Program 9. Program of while, for, break, continue, do-while, Nesting of loops

Program10. Program of Case switch statement, switch vs if-else, goto keyword

Program11. Program of Arrays

Program 12. Program of Two dimensional arrays

Program13. Program of Strings.

Program 14. Program of Declaring and initializing pointers, Pointer arithmetic, Pointers and arrays,

Program 15. Program of Pointers and Strings

Program 16. Program of function, Passing values between functions, calling functions, return type of function,

Program 17. Program of call by value, call by reference

Program 18. Program of Passing array to function PCs

Program 19. Program of passing strings to functions

Program 20. Program of Features of C Preprocessor, Macro expansion

Program 21. Program of File Inclusion, Conditional Compilation, #if and #elif directives, #undef, #pragma, Build process

Program 22. P rogram of Structures.

Program 23. Program of array of structures, nested structures

Program 24. Program of self-referential

Program 25. Program of Unions; union of structures; bit-fields

Program 26. Program of Console I/O: I/O types, Console I/O functions, Formatted console I/O, sprint() and sscanf(), Unformatted console I/O

Program 27. Program of File Input / Output: File operations, opening, reading and closing files

Program 28. Program of File Input / Output: File operations, opening, reading and closing files

Program 29. Program of File opening modes, String I/O, record I/O, text files and binary files, record I/O revisited

Program 30. Program of Operations on Bits: Bitwise operators – one's complement, right shift, left shift,

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	-	-	2	2	3	3	3	2	2
CO2	2	2	3	1	2	1	-	-	3	2	2	3	2	3	1
CO3	2	1	2	2	1	2	-	-	2	2	2	2	3	3	3
CO4	3	3	2	2	2	3	1	-	3	2	2	2	2	2	2
CO5	2	2	1	2	1	2	-	1	2	2	2	2	3	3	1
Average	**2.4**	**2.0**	**2.2**	**1.8**	**1.8**	**2.0**	**1**	**1**	**2.4**	**2.0**	**2.2**	**2.4**	**2.6**	**2.6**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Microprocessors and its Applications

Course Code: - A301201

Semester: 2nd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the microprocessor and its applications.
CO2	Analyze the instruction cycle and timing diagram.
CO3	Classify the various types of instructions.
CO4	Learn the architecture of 8086.
CO5	Utilize the 8257 Interrupt controller.

Course Contents

Section A

Introduction to Microprocessor: its historical background and Microprocessor applications.

Intel 8085: Microprocessor Architecture and its operations, 8085 MPU and its architecture, 8085.

Instruction cycle and timing diagram: Memory read and Memory Write operations,

8085: Data movement, Arithmetic and logic; and branch control instructions., RISC v/s CISC processors.

Intel 8086: Introduction, 8086Architecture, real and Protected mode, Memory Addressing, Memory Paging, Addressing Modes. Pin diagram of 8086, clock generator (8284A).

Section B

Various types of instructions: Data movement, Arithmetic and logic; and program control.

Interrupts: Introduction, 8257 Interrupt controller, basic DMA operation and 8237 DMA Controller, Arithmetic coprocessor, 80X87 Architecture.

References:

1. B. Brey The Intel microprocessors 8086/8086, 80186/80188, 80286,80386, 80486. Pentium pro processor Architecture,Programming and interfacing 4th Edition.

2. B. Ram Fundamentals of microprocessors and HI microcomputers, Dhanpat RaiPublication.

3. Ramesh S. Gaonkar Microprocessor Architecture, Programming and Applications with

8085,4th edition, Penram International Publishing (India).

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	2	2	3	3	2	3	1
CO2	2	2	2	1	3	2	1	1	2	2	3	3	1	2	3
CO3	2	2	1	2	2	2	3	2	1	3	3	3	3	1	2
CO4	3	2	1	1	3	2	-	1	2	2	3	2	1	3	1
CO5	2	2	3	3	3	1	-	1	2	2	3	2	3	2	2
Average	**2.4**	**2**	**2**	**1.8**	**2.8**	**1.8**	**2**	**1.2**	**1.8**	**2.2**	**3**	**2.6**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Distributed Computer Systems

Course Code: A301202

Semester: 2nd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the characterization of Distributed systems.
CO2	Classify the various API for internet protocols.
CO3	Grasp the various distributed objects and remote invocation.
CO4	Impart the name services and domain names.
CO5	Learn the physical clocks and logical clocks.

Course Contents

Section A

Characterization of Distributed Systems: Introduction- Resource Sharing and the Web-Challenges. System Models- Architectural- Fundamental. Interprocess Communication-Introduction-API for Internet protocols-External data representation and marshalling--Client-server communication-Group communication- Case study: Interprocess Communication in UNIX.

Distributed Objects and Remote Invocation: Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture. Distributed File Systems-Introduction-File service architecture-Case Study: Sun Network File System-Enhancements and further developments.

Section B

Introduction-Name Services and the Domain Name System: Directory Services-Case Study: Global Name Service. Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging. Coordination and Agreement-Introduction-Distributed mutual

exclusion-Elections-Multicast communication-Consensus and related problems. Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models.

Text Book/ Referencs:

1. George Coulouris, Jean Dollimore, Tim Kindberg,(2005).*Distributed Systems: Concepts and Design 4th Edition*. Pearson Education.

2. A.tS. Tanenbaum and M. V. Steen(2006).*Distributed Systems: Principles and Paradigms*,Second Edition. Prentice Hall.

3. M.L.Liu(2004*).Distributed Computing Principles and Applications*. Pearson Addison Wesley.

4. Mukesh Singhal(1994). *Advanced Concepts In Operating Systems*. McGraw Hill Series in Computer Science.

5. Nancy A. Lynch(2000*). Distributed Algorithms*. The Morgan Kaufmann Series in Data Management System, Morgan Kaufmann Publishers.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	2	2	3	3	2	3	1
CO2	2	2	2	1	3	2	1	1	2	2	3	3	1	2	3
CO3	2	2	1	2	2	2	3	2	1	3	3	3	3	1	2
CO4	3	2	1	1	3	2	-	1	2	2	3	2	1	3	1
CO5	2	2	3	3	3	1	-	1	2	2	3	2	3	2	2
Average	**2.4**	**2**	**2**	**1.8**	**2.8**	**1.8**	**2**	**1.2**	**1.8**	**2.2**	**3**	**2.6**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Data Structures & Analysis of Computer Algorithms

Course Code: - A301203

Semester: 2nd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Analyze Space and time complexity in given algorithms.
CO2	Summarize searching and sorting techniques.
CO3	Learn stack, queue and linked list operation.
CO4	Classify the concept of tree and graphs concepts.
CO5	Understand the various types of Hashing.

Course Contents

Section A

Basic concepts and notations in data structure operations: mathematical notation and functions, algorithmic complexity and time space trade off. Basic data structures such as arrays, stack and queues and their applications, linked and sequential representation. Linked list, representation of linked list, multi linked structures. Trees-definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap tree and heap sort algorithm, AVL trees.

Section B

Graphs and their application, sequential and linked representation of graph: adjacency matrix, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS

Hashing: Searching and sorting use of various data structures for searching and sorting, Linear and Binary search, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble sort, Quick sort, Heap Sort.

References:

1. A. Tannenbaum, Y. Lanhgsam and A.J.Augenstein(1990). *Data Structures Using C*. Prentice Hall of India.

2. Seymour Lipschultz(1988). Theory and Practice of Data structures. Mc Graw Hill.

3. E. Horowitz and S.Sahni(1991).*Data structures with Pascal*. Galgotia, 3rd edition.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	1	3	1	2	-	-	2	2	3	2	3	2	2
CO2	2	2	2	1	2	2	-	-	3	2	3	3	2	3	2
CO3	2	2	3	3	1	2	1	-	2	3	2	2	3	3	3
CO4	1	3	1	2	2	3	-	-	3	2	3	3	2	2	1
CO5	2	2	3	3	2	3	-	1	2	3	2	2	2	3	3
Average	**2.0**	**2.2**	**2.0**	**2.4**	**1.6**	**2.4**	**1**	**1**	**2.4**	**2.4**	**2.6**	**2.4**	**2.4**	**2.6**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Multimedia & Web Designing

Course Code: - A301204

Semester: 2nd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Learn the technical aspects of multimedia system.
CO2	Understand the various image animations.
CO3	Grasp the various audio and video formats.
CO4	Apply different coding techniques for solving problems.
CO5	Analyze multimedia tools for WWW.

Course Contents

Section A

Introduction to Multi-media Technology: Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS. Working of Internet, Connections, TCP/UDP/IP, IP addressing HTTP, SMTP, and E-mail SNMP, Domain Name Server, Internet Services,

WWW, Web Servers, Web Browsers: Web page makers and Editors, Plug-Ins and Delivery vehicles, URL, HTML. VoIP, Multimedia over IP Mobile IP/Next Generation Internet COM, DCOM, Scripting, and World Wide Web: Concepts, Web page: static, Dynamic, Active. Scripting languages: Server side, Client Side. Web site development Phases,

Section B

Web Designing: Development and Publishing, HTTP, URL registration, browsers, search engines, Web server, Proxy servers. HTML: Concepts, Structure of HTML documents, HTML Elements - Core attributes, Language attributes, Core Events, Block Level Events. Text Level Events, Linking Basics, Linking in HTML, Images and Anchors, Anchor Attributes, Image Maps, Semantic Linking Meta Information, Image Preliminaries, Image Download issues, Images as Buttons, Introduction to Layout: Backgrounds, Colors and Text, Fonts, Layout with Tables, Advanced Layout : Frames and layers,. Style Sheets, Positioning with Style sheets, Forms, Forms Control, New and emerging Form Elements. Front Page Web Tool: Front page editor, Front page explorer

References:

1. M. J. Crouch(2000). *Web Programming with ASP and COM*. Addison-Wesley.
2. D. Chapman(1998). *Web Development with Visual Basic 5*. PHI.
3. J. Greenberg and J.R. Lakeland(2000). *Building Professional Web Sites with the Right* Tools, Prentice Hall, PTR.
4. R. Steinmetz and K. Nahrstedt(1995). *Multimedia: Computing, Communications and Applications*. Prentice Hall, PTR.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	2	1	-	2	3	3	2	2	3	2
CO2	2	2	2	1	2	3	1	1	3	3	3	3	3	3	1
CO3	3	2	3	2	1	1	1	-	2	3	2	2	2	3	3
CO4	2	2	3	3	2	2	1	-	3	3	3	3	3	2	2
CO5	3	3	1	2	2	2	1	1	2	3	2	2	2	3	1
Average	**2.4**	**2**	**2**	**1.8**	**1.6**	**2**	**1**	**1**	**2.4**	**3**	**2.6**	**2.4**	**2.4**	**2.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Principles of Management Functions & Organizational Behaviour

Course Code: - A301205

Semester: 2nd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the various steps in planning.
CO2	Learn the process of decentralization and delegation.
CO3	Analyze the recruitment and selection techniques.
CO4	Classify the concepts of segmentation in market processing.
CO5	Learn the different functions of HRD.

Course Contents

Section A

Management: Nature and scope, Planning, Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies, policies and planning premises, the process of decision making.

Organizing: Nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

Section B

Controlling : Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques. Control process, control techniques

Directing: Conception, motivation, communication and leadership.

Introduction of the following function Areas: Production : Production systems Production planning and control, work study. Marketing : Concept, segmentation of market, marketing mix, marketing research. Finance – Finance functions, sources of finance for fixed assets and working capital structure.

HRD – concept, different functions of HRD

Reference:

1. Koontz & O' Donnell Essentials of Management
2. Stephen P. Robbins Management
3. Chabbra Business Organization and Management
4. T.N.Prasad Principles & Practice of Management
5. L.M.Arun Kumar & R. Sharma Principles of Business Management

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	2	2	3	3	2	3	1
CO2	2	2	2	1	3	2	1	1	2	2	3	3	1	2	3
CO3	2	2	1	2	2	2	3	2	1	3	3	3	3	1	2
CO4	3	2	1	1	3	2	-	1	2	2	3	2	1	3	1
CO5	2	2	3	3	3	1	-	1	2	2	3	2	3	2	2
Average	**2.4**	**2**	**2**	**1.8**	**2.8**	**1.8**	**2**	**1.2**	**1.8**	**2.2**	**3**	**2.6**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/w Lab-III(Data Structure using C/C++)

Course Code: - A301205

Semester: 2nd

L T P

Credits: 03 **4 1 0**

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

CO	Statement
CO1	Classify the time and space complexity of the data structures.
CO2	Grasp the appropriate data structure for a given problem.
CO3	Design sorting / searching techniques.
CO4	Solve Algorithmic problems like insertion and deletion of data.
CO5	Gain practical knowledge about the applications of data structures.

Course Contents

Programs 1 Program to input 1-D Array

Programs 2.Program to perform insertion in Arrays

Programs 3.Program to perform deletion in Arrays

Programs 4.Program to input 2-D arrays (Matrices)

Programs 5.Program to find transpose of a matrix multiply 2 matrices.

Programs 6. Program to implement sparse matrices.

Programs7. Program to perform linear search

Programs8. Program to perform Binary search

Programs9. Program to reverse array without using another variables.

Programs10. Program to perform Bubble sort.

Programs11. Program to perform sorting using Selection Sort.

Programs12. Program to perform sorting using Insertion Sort.

Programs13.Program to input and traverse N-nodes in a one way linked list.

Programs14. Program to reverse a one way linked list.

Programs15.Program to perform insertion/deletion in linked lists.

Programs16. Program to input and traverse doubly linked list.

Programs17. Program to implement stack operations.

Programs18. Program to implement Queues.

Programs19. Program to find factorial using recursion.

Programs20. Program to print Fibonacci series using recursion.

Programs21. Program to input a BST.

Programs22. Program to perform insertion in a BST.

Programs23. Program to perform deletion in a BST.

Programs24. Program to implement min-heaps.

Programs25. Program to implement max-heaps.

Programs26. Program to implement AVL trees.

Programs27. Program to perform rotations in AVL trees.

Programs28. Program to perform rotations in AVL trees.

Programs29. Program to input a graph.

Programs30. Program to print adjacency list of a graph.

Programs31. Program to perform traversal in graphs using DFS.

Programs32. Program to perform traversal in graphs using BFS.

Programs33. Program to implement shortest path methods.

Programs34. Programs to perform Dynamic memory allocation.

Programs35. Programs to perform sorting on data stored in a file.

Programs36. Programs to delete duplicates in arrays and linked lists.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	-	1	2	2	3	2	3	2	3
CO2	1	1	1	1	2	2	-	-	3	2	3	3	3	2	3
CO3	2	3	1	2	2	2	-	1	2	3	2	2	3	2	3
CO4	1	2	2	3	2	1	1	-	3	2	3	3	3	2	3
CO5	2	1	3	1	3	3	-	-	2	2	2	2	3	2	3
Average	**1.8**	**1.8**	**2.0**	**1.8**	**2.4**	**2.0**	**1**	**1**	**2.4**	**2.2**	**2.6**	**2.4**	**3**	**2**	**3**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/w Lab-IV(Web Designing)

Course Code: - A301206

Semester: 2nd

L T P

Credits: 02 **4 1 0**

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

CO	Statement
CO1	Understand an overview about servlet operations in DBMS.
CO2	Apply a valid XML document i.e. DTML.
CO3	Develop a dynamic webpage using java script.
CO4	Create an HTML document.
CO5	Install domain name for a website and on the remote side.

Course Contents

1. Creation of Web pages using: HTML, DHTML.
2. Creation of Web pages using: CSS.
3. Creation of Web pages using JavaScript.
4. Creation of Web pages using AJAX.
5. Database and AJAX.
6. XML.
7. PHP.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	2	2	3	1	2	-	-	2	2	3	2	3	3	2
CO2	3	1	2	1	2	2	-	-	3	2	3	2	2	3	3
CO3	2	2	3	3	3	1	`1	-	2	2	2	2	3	3	3
CO4	3	2	2	2	1	2	-	1	3	2	3	3	3	2	2
CO5	2	2	2	3	1	1	-	-	2	3	2	2	2	2	3
Average	**2.4**	**1.8**	**2.2**	**2.4**	**1.6**	**1.6**	**1**	**1**	**2.4**	**2.2**	**2.6**	**2.2**	**2.6**	**2.6**	**2.6**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Advanced Database Management System

Course Code: A301301

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Understand the basic concepts of database systems.
CO2	Learn the basics of SQL and construct queries using SQL.
CO3	Analyze the Concepts of Network, Hierarchical and Relational Data Models.
CO4	Get knowledge of the relational database theory and be able to write relational algebra expressions for queries.
CO5	Grasp the design principles for logical design of databases, including the E-R method and normalization approach.

Course Contents

Section A

Introduction: Overview of Database Management System: Various views of data Models, Schemes and Introduction to database Languages & Environments, Advantages of DBMS over file processing systems, Responsibility of Database Administrator. Three level architecture of Database Systems. Data Models: E-R Diagram (Entity Relationship), mapping Constraints, keys, Reduction of E-R diagram into tables.

Normalization: Integrity constrains, functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF.

Network, Hierarchical and Relational Data Models: Network Models, Hierarchical Models, Relational Models, Relational Algebra & various operations (set operations, select, project, join, division), Order.

Section B

Security and Recovery in Database: Database protection: Recovery, concurrency, security, integrity and control

Parallel and Distributed Databases and Client-Server Architecture: Architecture for

parallel database; Distributed database concepts, Data fragmentation, Replication, and allocation techniques, Overview of Client-Server Architecture.

Enhanced Data Models for Advanced Applications: Active database concepts, Temporal database concepts, Spatial databases, Deductive databases; Emerging Database Technologies: Mobile databases, Multimedia Databases

SQL: Introduction and Basic commands of SQL.

Text Books / Reference Books:

1. Elmasri Ramez, Navathe Shamkant B(2007). *Fundamentals of Database Systems*,5th Edition,Pearson Education, New Delhi.
2. Date C.J.(2002). *An Introduction to Database Systems*, 7th Edition, Pearson Education, New Delhi.
3. Silberschatz A., Korth H.F., Sudarshan S.(1997). *Database System Concept* 3rdEdition, Mc Graw-Hill, International Edition.
4. Hansen G.W(1999). *Database Management and Design*, 2nd Edition. Prentice-Hall of India, New Delhi.
5. Majumdar A,.K., Bhattacharyya P.(2007). *Database Management Systems* 5th Edition, Tata McGraw-Hill Publishing Company, New Delhi.
6. Data, C. and Darwen, H.(2003). *A Guide to the SQL Standard 3rd* Edition, Addison-Wesley Publications, New Delhi .

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	-	1	3	3	3	3	2	3	1
CO2	2	2	3	2	2	-	1	1	3	2	3	3	1	2	3
CO3	1	2	3	2	3	-	1	1	2	2	2	2	3	1	2
CO4	2	2	3	1	2	1	2	1	3	3	3	3	1	3	1
CO5	2	1	3	1	3	1	1	1	1	1	2	1	3	2	2
Average	**2**	**1.8**	**3**	**1.6**	**2.6**	**1**	**1.2**	**1**	**2.4**	**2.2**	**2.6**	**2.4**	**2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Operating System

Course Code: A301302

Semester: 3rd

L T P

4 0 0

Credits: 04

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

CO	Statement
CO1	Get acquainted with the fundamentals of Operating System.
CO2	Attain the mechanisms of OS to handle processes and threads.
CO3	Understand the role of paging, segmentation and virtual memory.
CO4	Gain knowledge of Mutual exclusion algorithms and semaphores.
CO5	Learn the deadlock detection algorithms and agreement protocols.

Course Contents

Section A

Introductory Concepts: Operating system functions and characteristics, historical evolution of operating system, Real time system, Distributed system, Methodologies for implementation of O/S service, system calls, system programs, Interrupt mechanisms.

Processes: Process model, Process states, process hierarchies, implementation of Processes, data structures used such as Process table, PCB creation of processes, context switching, exit of Processes.

Inter-process communication: Race conditions, critical sections, problems of mutual exclusion, Peterson's solution, producer-customer problem, Reader Writer's Problem, Dining Philosophers Problem, semaphores, monitors, message passing.

Process scheduling: objective, preemptive vs. non-preemptive scheduling, comparative assessment of different algorithms such as round robin, priority bases scheduling. FCFS, SJF, multiple queues with feedback

Section B

Deadlocks: Conditions, modeling, detection and recovery, deadlock avoidance, deadlock prevention.

Memory Management: Multiprogramming with fixed partition, variable partitions, virtual memory, paging, demand paging, design and implementation issues in paging such as page tables, inverted page tables, page replacement algorithms, page fault handling, working set

model, local vs. global allocation, page size, segmentation with paging.

File systems: File type, attributes, access and security, file operations, directory structures, path names, directory operations, implementation of file systems, implementation of file and file operation calls, implementation of directories, sharing of files, disk space management, block allocation, free space management, logical file system, physical file system.

Device management: Techniques for device management, dedicated devices, shared devices, virtual devices; device characteristics, hardware considerations: input & output devices, storage devices: independent device operation, buffering, multiple paths, device allocation considerations.

Text Books/ Reference Books:

1. Peterson, J.L. & Silberschatz, A(2010). *Operating System Concepts*, 2nd, Addison Wesley, NewDelhi.
2. Tanenbaum, A.S. (2002. *Operating System*, 3rd, PHI, New Delhi.
3. Hansen Brinch(2000). *Operating System Principles*. 3rd, PHI, New Delhi.
4. Willams Stalling. *Operating System*, 7th, PHI, Delhi.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	2	2	3	2	2	1	2	2	3	3	3	2	1
CO2	2	3	2	2	3	1	2	1	3	3	2	3	1	3	2
CO3	2	-	2	2	3	1	1	2	3	3	3	3	2	1	2
CO4	3	3	3	3	2	2	2	1	3	2	2	2	3	1	3
CO5	3	-	2	-	3	2	1	1	2	3	2	2	1	2	1
Average	2.6	2.6	2.2	2.2	2.8	1.6	1.6	1.2	2.6	2.6	2.4	2.6	2	1.8	1.8

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Object Oriented Analysis, Design & C++

Course Code: A301303

Semester: 3rd

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Get acquainted with all the basic concepts of C++ and its features such as composition of objects, Operator overloading.
CO2	Analyze the various access modifiers in C++ programs.
CO3	Learn programming using C++ features such as inheritance, Polymorphism etc.
CO4	Understand the various feature Like file handling , exception handling etc.
CO5	Use various object oriented concepts to solve different problems.

Course Contents

Section A

Introduction to C++: C++ standard library, Basics of a C++ Environment, Object Oriented Concepts, Introduction to objects and object oriented programming, Abstraction, Encapsulation, and Access Modifiers: controlling access to a class, method or variable (public, protected, private).

Classes and Data Abstraction: Introduction, structure definition, accessing members of a structure, class scope and accessing class members, separating interface from implementation, controlling access function and utility functions, Constructors, Destructors, friend function and friend classes, using "this" pointer, static class member, function overloading.

Operator Overloading: Introduction, fundamentals of operator overloading, restriction on operators overloading, operator function as class members vs. as friend functions, overloading unary operator, overloading binary operators.

Section B

Inheritance : Introduction , inheritance: base class, protected members, casting base class pointer to derived- class pointers, using member functions, Types of Inheritance, public, protected and private inheritance, using constructors and destructors in derived classes, implicit derived class object to base class object conversion , composition Vs. inheritance.

Virtual Functions and Polymorphism: Introduction to virtual function, abstract base class and concrete class, polymorphism, dynamic binding, virtual destructor, Implementation in C++ using virtual function.

Files and I/O Streams: Files and streams, creating a sequential access file, reading data from A Sequential access file, updating Sequential Access file, Random Access File , Creating A Random Access File, Writing data Randomly To a random Access file, Reading Data Sequentially from A Random Access File.

Exception Handling: Introduction, Basic of C++ Exception Handling: Try, Catch, Throwing, Catching and Re–throwing an Exception, Exception specification, Processing Unexpected Exception.

Text Books/ Reference books:

1. Lafore Robert (2015**).** *Object Oriented Programming in Turbo **C+ +,*** 1st, Pearson Education, New Delhi.
2. Kamthane(2013). *Object Oriented Programming Using C++*, 2nd, Pearson Education, New Delhi.
3. Salaria R.S.(2006). *Mastering object Oriented Programming with C++* 3rd, Salaria Publishing House.
4. Deitel H M, Deitel P**.** *C + + How to Program*, Prentice Hall, India, New Delhi.
5. Schildt Herbert. *The Complete Reference in C++*, TMH, New Delhi.
6. Ravichandran D**.** *Programming with C++* TMH, New Delhi.
7. Balagurusamy E. *Object Oriented Programming with C++*, Tata McGraw- Hill, New Delhi.
8. Horstmann. *Computing Concept with C++ Essentials*, John wiley, New Delhi.
9. Easttom Chuck. *C++ Programming Fundamentals*, Firewall Medi.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	1	1	-	2	2	2	3	1	3	2
CO2	3	1	1	-	2	1	2	1	3	2	2	2	3	2	1
CO3	3	2	2	1	2	1	1	1	3	2	2	3	2	1	3
CO4	3	1	2	2	2	1	2	1	2	3	2	2	1	3	2
CO5	2	2	1	1	1	2	1	2	3	2	2	3	3	2	3
Average	**2.8**	**1.6**	**1.6**	**1.25**	**1.8**	**1.2**	**1.4**	**1.25**	**2.6**	**2.2**	**2**	**2.6**	**2.6**	**2.2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Discrete Mathematics

Course Code: A301304

Semester: 3rd

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Attain all the basic principles of sets and operations in sets.
CO2	Write an argument using logical notation and determine whether the argument is valid or not.
CO3	Get knowledge about all counting principles to determine probabilities.
CO4	Understand the various properties of relations and functions.
CO5	Learn different traversal methods for trees and graphs.

Course Contents

Section A

Set Theory: Introduction to set theory, Set operations, Algebra of sets, combination of sets, Duality, Finite and Infinite sets, Classes of sets, Power Sets, Multi sets, Cartesian Product.

Relations and Functions : Representation of relations, Types of relation, Binary Relations, Equivalence relations and partitions, Partial ordering relations and lattices, Mathematics Induction, Principle of Inclusion & Exclusion. Function and its types, Composition of function and relations, Cardinality and inverse relations. Functions & Pigeonhole principle.

Propositional Calculus: Basic operations: AND (^), OR (v), NOT (~), Truth value of a compound statement, propositions, tautologies, contradictions.

Recursion And Recurrence Relation: Sequences, Introduction to AP and GP series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, Particular solutions, Total solution of a recurrence relation using generating functions.

Combinatorial Mathematics: Techniques of counting: Rule of sum, Rule of product. Permutations & Combinations.

Section B

Algebraic Structures: Definition, elementary properties of algebraic structures, Basic algebraic structures: Semi group, monoid, group, subsemigoup, submonoid, subsemigroup. Congruence relations. Homomorphism, Isomorphism and Automorphism, Subgroups and

Normal subgroups, Cosets, Lagrange‟s theorem, cyclic groups. Rings, Types of rings, division rings, Integral domains and fields

Graph Theory: Introduction to graphs , Directed and undirected graphs, Homomorphic and Isomorphic graphs, Subgraphs, Multigraph and Weighted graph, Paths and circuits, Shortest path in weighted graphs, Eulerian paths and circuits, Hamiltonian paths and circuits. Planar graphs, Euler‟s formula.

Trees: Introduction to trees, Difference between a graph and a tree, Rooted Trees, Path length in trees, Spanning Trees & cut-sets, Minimum cost spanning trees, Binary trees and its traversal.

Text Books /Reference Books:

1. Santha, *Discrete Mathematics with Graph Theory*, Cengage Learning.
2. Ronald G, Knuth, Donald and Patashik, Oren, "*Concrete Mathematics: AFoundation for Computer Science*, Addison-Wesley.
3. Kolman , B. and Busby ,R.C, *Discrete Mathematical Structures*, PHI.
4. Gersting, Judith L, *Mathematical Structures for Computer Science***,** Computer Science Press.
5. Doerr and Levasseur, *Applied Discrete Structures for Computer Science*.
6. Tembley & Manohar, *Discrete Mathematical Structures with Applications to Computers*, Mc Graw Hill.
7. Rosen K. H, *Discrete Mathematics and its applications*, Mc-Grawhill.
8. Lyengar, N Ch SN, Chandrasekaran, VM, *Discrete Mathematics*.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	2	2	2	1	1	1	2	3	1	2	2	3	2	1
CO2	1	3	3	1	1	1	1	2	2	2	1	2	1	3	2
CO3	2	2	3	2	2	1	1	1	2	2	2	2	2	1	2
CO4	2	2	3	3	2	1	-	1	3	2	2	3	3	1	3
CO5	2	2	3	2	2	-	1	2	2	2	3	3	1	2	1
Average	**1.8**	**2.2**	**2.8**	**2**	**1.6**	**1**	**1**	**1.6**	**2.4**	**1.8**	**2**	**2.4**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Computer Organization and Architecture

Course Code: A301305

Semester: 3rd

Credits: 04 **L T P**

4 0 0

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

CO	Statement
CO1	Grasp the theory and architecture of central processing unit.
CO2	Understand the concepts of register transfer logic and arithmetic operations.
CO3	Access and organize various types of Memories and mapping process.
CO4	Memorize microprocessor architecture and assembly language programming.
CO5	Recognize the general concepts in digital logic design and their use in combinational and sequential logic circuit design.

Course Contents

Section A

Number System: Number conversions, Arithmetical operations, Concepts about bits, bytes and word.

Representation of Information: Integer and floating point representation, Complement schemes, Character codes (ASCII, EBCDIC, BCD, 8421, 2421, Excess-3, Grey, Hamming, Parity). Basic Building blocks: Boolean Algebra, K-maps.

Combinational logic design: half-adder/subtractor, full adder/subtractor, parallel adder, Multiplexers, Demultiplexers, Decoders, Encoders.

Sequential circuits- concept, flip-flops (RS, D, JK, JK-Master-Slave, T), counters (Asynchronous, Synchronous) Mod-3, Mod-5, Decade Counter.

Computer organisation: Structure of Computer, Instruction codes, Instruction formats, Instruction cycle, Addressing modes

Section B

Register Transfer Language, Arithmetic, Logic and Shift micro-operations,

Control Memory: Design of control unit, Micro program Sequencer, Micro programmed and hardwired control unit (overview only), Features of RISC and CISC.

Memory organization: Concepts of semiconductor memory, CPU- memory interaction, organization of memory modules, Cache memory and related mapping and replacement

policies, Virtual memory

I/O organization: I/O interface, Modes of data transfer: Programmed - initiated, Interrupt initiated, DMA, I/O controllers

Architecture of 8085: Assembly language programming of 8085 machine.

Text Books/ Reference Books:

1. D. P. Leach, A. P. Malvino(2002), *Digital principles & applications* , Tata McGraw-Hill Edition.
2. William Stallings(2002*), Computer Organisation and Architecture*, 6th edition, Pearson Education .
3. A.S.Tannenbaum(1999), *Structured Computer Organisation*, Prentice- Hall of India,
4. JyotsnaSengupta(2009), *Fundamentals of Computer Organization and Architecture*, NuTech Books, Deep and Deep Publications, New Delhi.
5. M.M. Mano(2002)**,** *Computer System Architecture*, Third Edition, Prentice-Hall of India,.
6. Vincent.P.Heuring, Harry.F.Jordan(2000*), Computer Systems Design and Architecture* , Addison Wesley,.
7. Nicholas Carter(2002), *Schaum's Outlines Computer Architecture*, Tata McGraw Hill.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	-	-	1	2	3	2	2	3	2	1
CO2	3	2	2	2	1	-	-	1	3	2	2	2	1	3	2
CO3	2	1	2	1	1	1	2	2	1	2	2	2	2	1	2
CO4	3	2	2	2	2	-	1	2	2	3	3	3	3	1	3
CO5	3	2	2	2	2	1	1	1	2	3	3	3	1	2	1
Average	**2.4**	**1.8**	**2.2**	**1.8**	**1.6**	**1**	**1.3**	**1.4**	**2**	**2.6**	**2.4**	**2.4**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: SOFTWARE LAB-V (C++)

Course Code: A301306

Semester: 3rd

L T P

Credits: 03 **0 0 6**

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

CO	Statement
CO1	Understand the object-oriented concepts to solve problems.
CO2	Develop applications using object oriented concepts.
CO3	Apply C++ features to design a given problem.
CO4	Identify the features and peculiarities used in C++ programming language.
CO5	Use C++ language to demonstrate practical experience in developing real word problems.

Course Contents

Section-A

Practical1. Program to show the of use cin, cout

Practical2.Program to implement the operators

Practical3. Program based on decision making statement (if else)

Practical4. Program based on the loops (while,do while)

Practical5. Program based on loops (for), switch statement

Practical6. Program based on structures and enumerated data types

Practical7. Program based functions, overloaded functions

Practical8. Program to show usage of storage classes.

Practical9. Program to show usage of function overloading, default arguments

Practical10. Program to show usage of classes, objects

Practical11. Program to show usage of constructors, destructors

Practical12. Program to manipulate arrays and array of objects

Practical13. Program to manipulate strings.

Practical14. Program to show usage of inheritance of various type (multiple, multilevel etc.)

Practical15. Program to show usage of unary operator overloading

Practical16. Program to show usage of binary operator overloading

Practical17. Program for conversion from basic to user defined data type

Practical18. Program for conversion from user defined to basic

Practical19. Program to show usage of basics of pointers

Practical20. Program to show usage of pointers and arrays.

Practical21. Program to show usage of pointers, function arguments

Practical22. Program to show usage of new, delete, memory management

Practical23. Program to show usage of virtual function

Practical24. Program to show usage of friend, static function

Practical25. Program to show usage of overloaded assignment operator, this pointer

Practical26. Program to read & write contents of a text file

Practical27. Program to show usage of file pointers.

Practical28. Program to show usage of command line arguments

Practical29. Program to show usage of overloading of right & left shift operators.

Practical30. Program to show usage of exception handling mechanism

Practical31. Program to show usage of uncaught_exception(), the exception and bad_exception classes

Practical32. Program to show usage of templates

Practical33. Program to show usage of generic classes

Practical34. Implementation of File handling

Practical35. Implementation of Wrapper classes

Practical36. Implementation of container classes

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	1	1	2	2	2	3	3	2	1
CO2	3	2	2	1	1	1	1	1	2	2	3	3	1	3	2
CO3	3	2	3	2	2	1	1	1	3	2	2	2	2	2	3
CO4	3	1	2	1	2	1	1	1	2	2	3	3	3	1	2
CO5	3	3	3	2	2	1	1	1	2	2	3	3	1	2	3
Average	**3**	**2.2**	**2.6**	**1.6**	**1.8**	**1**	**1**	**1**	**2.2**	**2**	**2.6**	**2.8**	**2**	**2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Software Lab-VI(Advanced Database Management System Lab)

Course Code: A303307

Semester: 3rd

Credits: 02 **L T P**

0 0 4

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

CO	Statement
CO1	Apply the basic concepts of Database Systems and Applications.
CO2	Design and implement a database schema for a given problem-domain
CO3	Use the basics of SQL and construct queries using SQL in database creation and interaction.
CO4	Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
CO5	Analyze and Select storage and recovery techniques of database system.

Course Contents

Section-A

1. Data Manipulation Language Commands
2. Data Control Language, Transfer Control Language Commands
3. In Built Functions
4. Nested Queries And Join Queries
5. Set operators
6. Views
7. Control Structure
8. Procedure and Function
9. Trigger
10. Front End Tools
11. Form
12. Menu Design
13. Report Generation
14. Database Design And Implementation Payroll Processing

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	2	2	2	1	-	1	-	1	1	2	2	3	2	1
CO2	3	3	3	2	1	1	2	1	1	1	2	2	1	3	2
CO3	2	2	3	1	1	-	1	-	-	-	1	2	2	1	2
CO4	2	2	2	2	1	-	-	1	1	1	1	1	3	1	3
CO5	2	2	2	2	2	-	2	1	1	1	2	2	1	2	1
Average	**2.2**	**2.2**	**2.4**	**1.8**	**1.2**	**1**	**1.5**	**1**	**1**	**1**	**1.6**	**1.8**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High

Course Name: Computer Based Optimization Techniques

Course Code: A301401

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the mathematical, engineering, and modeling skills that are the basis for computer based optimization techniques.
CO2	Learn the theory of optimization methods and algorithms developed for solving various types of optimization problems.
CO3	Apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.
CO4	Solve Probability and Uncertainty problems.
CO5	Analyze Decision Tree using various method such as Integer programming and Branch & Bound method.

Course Contents

Section-A

Origin & development of O.R.: Nature & Characteristic features of O.R., Models &Modelling in Operation research. Methodology of O.R., general methods for solving O.R. & decision making, application, use & limitations of O.R. Linear Programming formulation, graphical & simplex method, duality in L.P. Transportation Problems: Loops, Test For Optimality, Degeneracy In Transpiration Problems. Unbalanced Transportation Problems.Transmanship Problems, Assignment & Routing Problems, Travelling Salesman Problem.

Section-B

Probability & Uncertainty: Sample Space & Probability, Algebra of Events, Conditional Probability. Decision Making: Decision Making, Environment, Decision under Uncertainty, Decision under Risk, Decision Tree Analysis. Revised Simplex Method, Integer Programming, Branch & Bound Method, Dynamic Programming.

References:

1. Swarup Kanti, Gupta P.K, Manmohan(1994). *Operation Research*. Sultan Chand & Sons,Seventh Ed.
2. Sharma S.D.(1992).*Operation Research*. Kedar Nath Ram Nath And Co. Meerut, Tenth Ed.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	2	2	3	2	1	1	1	2	2	1	2	2	1	3
CO2	2	2	1	2	1	-	-	1	1	1	2	2	3	2	2
CO3	1	3	3	2	1	-	1	1	2	2	2	2	2	3	1
CO4	2	2	2	2	1	-	-	1	1	1	1	1	3	2	3
CO5	1	2	1	3	1	-	-	1	1	2	2	2	2	1	2
Average	**1.6**	**2.2**	**1.8**	**2.4**	**1.2**	**1**	**1**	**1**	**1.4**	**1.6**	**1.6**	**1.8**	**2.4**	**1.8**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Object Oriented Technologies and Java Programming

Course Code: A301402

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the concepts of data types, variables, arrays of object oriented programming.
CO2	Analyze interfaces, class hierarchies and exception in programs.
CO3	Construct appropriate diagrams and textual descriptions to communicate the AWT and Applet for web applications.
CO4	Implement the concept of SQL package, multithreading and JDBC in java.
CO5	Solve specified problems by using the Java SDK environment to create, debug and run simple Java programs.

Course Contents

Section-A

History and Evolution of Java: Data Types, Variables and Arrays, Operators, Control Statements, Introducing Classes, A Closer Look at Methods and Classes.

Inheritance: Basics, Using super, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using final with inheritance, The object Class.

Packages and Interfaces: Defining a package, Finding packages and CLASSPATH, Access Protection, Importing Packages, Defining an Interface, Implementing Interface, Nested Interface, Applying Interface, Variables in Interfaces, Exception Interface: Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Multiple catch clauses, Nested try Statements, throw, throws, finally, Java's inbuilt Exceptions, Creating own Exception Subclasses, Chained Exceptions, Using Exceptions, Multithreaded Programme: The java Thread Model, The Main Thread, Creating a thread, Creating Multiple Threads, Using is Alive() and join (), Thread Priorities, Synchronization, Inter thread Communication, Suspending, Resuming, and Stopping Threads, Using Multithreading.

Section-B

I/O Basics: Streams, Byte Streams, Character Streams, The Predefined Streams, Reading Console Input, Writing Console Output, The Print Writer Class, Reading and writing files, Applet Fundamentals, The Transient and volatile Modifiers, Using Instance of, Static Import, Invoking Overloaded constructors Through this().

Introduction to Swing, Event handling, String Handling, Primitive Type Wrappers, Java and **Database:** JDBC Basics, SQL Package in Java, Working with database, Creation of JDBC Statements, Networking in Java: Basics

Textbooks/ References:

1. Naughton Patrick, Schildt Herbert(1999). *The Complete Reference Java 2*. Tata Mc Graw Hill.
2. Arnold Ken, Gosling James, Holmes David. *Java Programming Language*, Third Edition. Pearson Publications.
3. URL: http: //java.sun.com/docs/books/tutorial/jdbc/basics/index.html .
4. Shah.*Core Java for Beginners*. Shroff- X team.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	1	1	1	2	3	3	2	1	2	1
CO2	3	3	2	2	1	1	1	1	2	2	2	3	2	3	2
CO3	3	2	3	2	2	2	1	1	3	2	2	2	3	2	3
CO4	3	2	2	1	1	1	1	1	2	2	3	2	2	1	2
CO5	3	2	2	3	2	1	1	1	2	2	2	3	1	2	3
Average	**3**	**2.2**	**2.2**	**2**	**1.6**	**1.2**	**1**	**1**	**2.2**	**2.2**	**2.4**	**2.4**	**1.8**	**2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Advance Data Structure

Course Code: 301412

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the basic concepts of Linear and Non Linear Data Structures.
CO2	Apply step by step approach in solving problems with the help of data structures
CO3	Learn the applications of stacks, queues, lists, trees and graphs.
CO4	Develop the dictionary of real word objects.
CO5	Apply the computerized methods to solve the real time problems.

Course Contents

Section-A

Basic Data Structures – Arrays, Stacks, Queues and Linked Lists. Binary Tree- Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree, Red-Black Tree, Splay Tree. Trie – Simple Trie, Multiway Trie, Compressed Trie

Section-B

Heap – Heap, Interval Heap, Binomial Heap, Fibonacci Heap, Priority Queue, Double Ended Priority Queue, M-Way Tree - 2-3 Tree , B Tree, B+ Tree, Huffman algorithm, Hash Table, **Binary Search Tree and Red-Black Tree, Graph** – Directed and Undirected Graphs. Finding shortest path and detecting cycle in a Graph. Minimum Spanning Tree. Disjoint Set Data Structures.

Text Books/Reference Books:

1.Weiss M. A., *Data Structures and Algorithm Analysis in C++*, Pearson Education Asia, 2002.

2. Goyal V., GoyalL., Kumar P., *A Simplified Approach to Data Structures*, Shroff Publishers, 2014.

3. Sahni S., *Data structures, Algorithms and Applications in C++*, University Press (India)

Pvt. Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2	1	3	3	2	3	3	2	1
CO2	3	3	3	3	2	2	1	1	3	2	3	3	2	3	2
CO3	3	2	2	1	2	1	1	1	2	2	2	3	1	2	3
CO4	3	2	1	1	1	2	1	2	1	1	1	2	2	3	2
CO5	3	3	2	1	2	1	1	1	2	2	3	2	1	3	3
Average	3	2.4	2.2	1.6	2	1.6	1.2	1.2	2.2	2	2.2	2.6	1.8	2.6	2.2

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Theory of Computation

Course Code: A301405

Semester: 4th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Recognize the terminologies used in formal languages.
CO2	Analyze the Regular languages, Expression and Grammars.
CO3	Design different types of Finite Automata and Machines as Acceptor, Verifier and Translator.
CO4	Analyze Context Free languages, Expression and Grammars.
CO5	Design different types of Push down Automata as Simple Parser.

Course Contents

Section-A

Introduction: Basic Terminology: Alphabet, Formal Language and operations on formal languages, Examples of formal languages.

Finite automata : Concept of Basic Machines, Properties and Limitations of Finite State Machines, Deterministic Finite Automata(DFA),Non-Deterministic Finite Automata(NFA), Equivalence of DFA and NDFA , Non-Deterministic Finite automata with Λ-Transitions.

Regular expression: Regular Languages and Regular Expressions, Kleen's Theorem. Arden's Method.

Properties of Regular sets: The Pumping Lemma for Regular sets, Application of the Pumping Lemma, Closure Properties of Regular Sets, Myhill- Nerode Theorem and Minimization of Finite Automata, Minimization Algorithm.

Finite Automata with output: Moore and Mealy Machines. Equivalence of Moore and Mealy Machines.

Section-B

Context Free Grammars: Examples and Definitions, Derivation trees and ambiguity, An Unambiguous CFG for Algebraic Expressions. Regular Grammar, Simplified forms and Normal forms: Removal of useless symbols and unit production, Removal of Λ-moves, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

Pushdown Automata: Introduction and Definition of Push-Down Automaton, Applications of Push down Automata.

Turing Machines: Definitions and Examples, Deterministic and Non- Deterministic Turing Machines, Unsolvable Problems: A Nonrecursive Language and an Unsolvable Problem, PCP Problem and MPCP Problem.

More General Languages and Grammars: Recursively Enumerable and Recursive Languages, Unrestricted grammars, Context sensitive Language and grammar. Relation between languages of classes, Chomsky hierarchies of grammars.

Text Books/ Reference Books:

1. Martin J.C. *Introduction to Languages and Theory of Computation*. Tata Mc Graw-Hill Publising Company Limited, 3rd Edition.
2. Hopcroft J.E. and Ullman J.D. *Introduction to Automata Theory Languages and Computation.* Narosa Publications.
3. Sipser. *Theory of Computation*. Cengage Learning.
4. Daniel I.A. Cohen. *Introduction to computer Theory*.John Wiley.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	1	2	1	2	2	2	3	1
CO2	3	1	1	2	1	1	2	1	1	2	1	1	3	1	2
CO3	3	1	1	1	1	2	1	2	1	1	1	2	2	2	3
CO4	3	2	2	1	2	1	1	1	2	1	2	1	3	1	2
CO5	3	1	1	2	1	2	1	2	1	2	2	2	1	2	3
Average	**3**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.4**	**1.4**	**1.6**	**1.6**	**2.2**	**1.8**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/W Lab VII(Java Programming)

Course Code: A301406

Semester: 4th

L T P

Credits: 03 **0 0 6**

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

CO	Statement
CO1	Get knowledge about the structure and model of the Java programming language.
CO2	Implement the given problems in Java programming language.
CO3	Develop software in the Java programming language.
CO4	Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.
CO5	Get learning ability to connect Java programs to database using JDBC.

Course Contents

1. Implementation of classes, inheritance, overloading.
2. Implantation of packages and interfaces
3. Implantation of threads.
4. Implementation of Applets, mouse events, and keyboard events.
5. Connecting to Database using JDBC.
6. Deployment of Servlets, JSP and EJB.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	1	1	1	2	2	3	3	2	3	1
CO2	3	3	2	1	3	2	2	1	2	2	2	2	3	2	3
CO3	3	2	3	2	2	1	1	1	2	2	3	2	2	1	2
CO4	3	3	2	1	2	1	1	1	1	2	2	3	1	3	2
CO5	3	3	3	2	2	2	1	1	2	2	2	2	2	2	3
Average	**3**	**2.6**	**2.4**	**1.6**	**2.2**	**1.4**	**1.2**	**1**	**1.8**	**2**	**2.4**	**2.4**	**2**	**2.2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: S/w Lab-VIII (Advanced Data Structure using C/C++)

Course Code: 301413

Semester: 4th

L T P

Credits: 03 **0 0 6**

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

CO	Statement
CO1	Develop solutions for a range of problems using functional/object oriented programming.
CO2	Implement the Array and the basic operations that can be performed on it.
CO3	Write the programming code to implement the Link List Structure.
CO4	Implement the Stack and queue Data Structure using array and Link List.
CO5	Choose the appropriate data structure and algorithm to design a specified application.

Course Contents

1. Write a program to insert an element into an array
2. Write a program to delete an element from an array.
3. Write a program to implement linear search algorithm
4. Write a program to implement binary search algorithm
5. Write a program to implement bubble sort algorithm.
6. Write a program to implement selection sort algorithm.
7. Write a program to implement PUSH operation in stacks.
8. Write a program to implement POP operation in stacks.
9. Write a program to implement Queues.
10. Write a program to insert an element in the beginning of the link list.
11. Write a program to insert an element in the middle of the link list.
12. Write a program to insert an element in the end of the link list.
13. Write a program to delete an element from the beginning of the link list.
14. Write a program to delete an element from the end of the link list.
15. Write a program for implementation of a graph.
16. Write a program for implementation of binary search tree.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	2	1	1	3	3	2	-	-	2	2	3	2	2	3	3
CO2	1	2	2	2	3	2	-	-	3	1	3	3	3	2	1
CO3	2	2	3	3	2	3	-	-	2	2	2	2	2	1	3
CO4	3	1	3	1	3	2	1	-	3	1	3	3	3	3	2
CO5	1	2	1	3	1	2	-	1	2	3	2	2	3	2	1
Average	**1.8**	**1.6**	**2**	**2.4**	**2.4**	**2.2**	**1**	**1**	**2.4**	**1.8**	**2.6**	**2.4**	**2.6**	**2.2**	**2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Data Mining

Course Code: 301408

Semester: 2nd

Credits: 04 **L T P**

4 0 0

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

CO	Statement
CO1	Understand the functionality of various Data mining technique.
CO2	Familiarize with the process of data analysis, identifying the problems and choosing the relevant models and algorithms to apply.
CO3	Apply the Association rules of Data Mining.
CO4	Interpret the various Classification & Prediction Data Mining Techniques.
CO5	Learn to evaluate different clustering methods.

Course Contents

Section A

Introduction to data mining Data mining primitives, Techniques: - Clustering, classification, association rules, linear and multiple regression, Feature selection, Mining and text databases, multimedia databases, data preprocessing: data summarization, data cleaning ,data reduction. Text Mining, Mining Spatial, Data Mining Application.

Mining Frequent Pattern: Basic concept, market basket analysis ,frequent pattern mining, frequent itemset mining methods, mining frequent itemset using candidate generation, mining frequent itemset without candidate generation methods, mining various kind of association rules.

Section B

Classification Issues regarding classification and prediction, Decision tree classifier, baysian classification, rule based classification, neural network classification, back propagation.

KNN classifier, classifier accuracy, Support Vector Machines, introduction to other classification methods like genetic algorithm, rough set approach.

Clustering What is cluster analysis, types of cluster analysis, a categorization of major clustering method ,partition, hierarchical ,density based, grid based method, outlier analysis

Text Books:

1. Dunham Margaret H(2002), *Data Mining: Introductory and Advanced Topics.*
2. Han Jiawei, Kamber Micheline (2006), *Data Mining:Concepts and Techniques***,** 2nd ed.
3. Morgan Kaufmann, 2006.
4. Pujari Arun, (2001) *Data Mining Techniques*, University Press,
5. Hand D, Mannila H. and SmythP, (2006) *Principles of Data Mining*, Prentice-Hall of India.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	1	1	1	2	2	3	3	3	2	1
CO2	2	2	3	2	1	2	2	-	3	2	2	3	1	3	2
CO3	3	3	2	3	3	2	-	1	2	3	2	2	2	1	2
CO4	2	2	3	3	3	2	-	2	3	2	2	2	3	1	3
CO5	3	2	1	2	3	2	2	-	2	2	2	3	1	2	1
Average	**2.6**	**2.4**	**2.2**	**2.4**	**2.6**	**1.8**	**1.6**	**1.3**	**2.4**	**2.2**	**2.2**	**2.6**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Soft Computing

Course Code: 301409

Semester: 4th

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Understand the soft computing techniques and their applications.
CO2	Analyze various neural network architectures.
CO3	Utilize preceptor and counter propagation networks.
CO4	Learn the fuzzy systems.
CO5	Analyze the genetic algorithms and their applications.

Course Contents

Section A

Neural Networks: Introduction to neural networks, working of an artificial neuron, linear seperability, perceptron, perceptron training algorithm, back propagation algorithm, adalines and madalines.

Supervised and unsupervised learning: counter-propagation networks, adaptive resonance theory, neocognitron and bidirectional associative memory.

Section B

Fuzzy Logic: Introduction to fuzzy logic and fuzzy sets, fuzzy relations, fuzzy graphs, fuzzy arithmetic and fuzzy if-then rules. Applications of fuzzy logic, neuro-fuzzy systems.

Probabilistic Reasoning

Introduction to probability theory: conditional probability, Baye's theorem, fuzzy logic and its relationship with probability theory.

References:

1. Mehrotra Kishan, Chilkuri K. Mohan and Ranka Sanjay, *Elements of artificial neural networks*, 2007
2. Hassoun Mohammad H., *Fundamentals of artificial neural networks* Prentice Hall of India, 2007.

3. Kosko Bart, *Neural networks and fuzzy systems*, Prentice Hall of India, 2007 Edition.
4. Yen John and Langarim Reza, *Fuzzy logic, intelligence, control and information*, Pearson Education, 2007.
5. Spiegel Murray R., Schiller John and AluSrinivasan R., *Probability and statistics*, Schaum's Outlines, Tata McGraw Hill Publishing Company Limited, 2007.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	2	1	2	2	2	3	3	3	2	1
CO2	3	3	3	2	3	2	1	1	3	2	3	3	1	3	2
CO3	2	2	2	2	2	2	1	1	2	2	2	3	2	1	2
CO4	3	2	3	3	2	2	2	1	3	2	3	3	3	1	3
CO5	2	2	2	3	2	2	2	2	1	1	2	3	1	2	1
Average	2.6	2.2	2.6	2.4	2.2	2	1.4	1.4	2.2	1.8	2.6	3	2	1.8	1.8

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Machine Learning

Course Code: 301410

Semester: 4th

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Understand the basic concepts of Bayesian Decision Theory.
CO2	Impart Machine Intelligence and its applications
CO3	Learn class conditional probability distributions.
CO4	Get knowledge about the working of Perceptron learning algorithm, criterion and Widrow-Hoff learning algorithm
CO5	Depict classification algorithms like Nearest Neighbor classification, K-nearest neighbor and their applications.

Course Contents

Section-A

Overview and Introduction to Bayes Decision Theory: Machine intelligence and applications, pattern recognition concepts classification, regression, feature selection, supervised learning class conditional probability distributions, Examples of classifiers bayes optimal classifier and error, learning classification approaches.

Linear machines: General and linear discriminates, decision regions, single layer neural network, linear separability, general gradient descent, perceptron learning algorithm, mean square criterion and widrow-Hoff learning algorithm; multi-Layer perceptrons: two-layers universal approximators, back propagation learning, on-line, off-line error surface, important parameters.

Section-B

Learning decision trees: Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples entropy, mutual information, ID3 algorithm criterion, C4.5 algorithm continuous test nodes, confidence, pruning, learning with incomplete data

Instance-based Learning: Nearest neighbour classification, k-nearest neighbour, nearest neighbour error probability,

Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, Occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoffs.

Text Books

1. Alpaydin E. *Introduction to Machine Learning*. Prentice Hall of India.

2. Mitchell T. M. *Machine Learning*. McGraw-Hill.

3. Bishop C. M. *Pattern Recognition and Machine Learning*. Springer.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	1	2	1	2	1	1	1	2	2	2	3	3	2	3
CO2	3	2	2	1	2	1	1	1	2	2	3	3	2	3	2
CO3	3	2	1	2	1	2	1	2	2	2	3	2	1	2	1
CO4	3	2	2	1	1	2	1	2	1	1	2	3	3	3	2
CO5	3	1	2	1	2	2	2	1	1	2	1	3	2	1	3
Average	**3**	**1.6**	**1.4**	**1.2**	**1.6**	**1.6**	**1.2**	**1.4**	**1.6**	**1.8**	**2.2**	**2.8**	**2.2**	**2.2**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Elective-I

Course Name: Artificial Intelligence

Course Code: 301411

Semester: 4th

L T P

Credits: 04 **4 0 0**

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

CO	Statement
CO1	Understand the various searching techniques.
CO2	Classify the role of agents and the way of evaluating it.
CO3	Analyze and design a real world problem for dynamic behavior of a system.
CO4	Compare different machine learning techniques to design AI machine and enveloping applications for real world problems.
CO5	Learn the natural language processing and parsing techniques.

Course Contents

Section-A

Concept of intelligence: An Overview of AI: The AI problems, what is an AI technique; Characteristics and applications of AI, General Problem solving: Production systems; Control strategies; forward and backward chaining, Exhaustive searches: Depth first Breadth first search.

Heuristic Search Techniques: Hill climbing, Branch and Bound technique; Best first search and A* algorithm; AND/OR Graphs; Problem reduction; Constraint Satisfaction problems Game Playing Min Max Search procedure; Alpha-Beta cutoff; Additional Refinements.

Section-B

Knowledge Representation Techniques: First Order Predicate Calculus; Inference Mechanisms Horn's Clauses; Semantic Networks; Frame Systems; Scripts; Conceptual Dependency, AI Programming Languages: Introduction to LISP, Syntax and Numeric Function; List manipulation functions; Iteration and Recursion; Property list and Arrays.

Natural Language Processing and Parsing Techniques: Context Free Grammar; Recursive Transition Nets (RTN); Augmented Transition Nets (ATN); Semantic Analysis, Case and Logic Grammars; Probabilistic Reasoning and Uncertainty: Probability theory; Bayes

Theorem and Bayesian networks; Certainty Factor. Introduction to Expert Systems, Architecture of Expert Systems;

Text Books:

1. Rich Elaine, KnightKevin, *Artificial Intelligence*, 3rd Edition, Tata McGraw Hill, 2008.
2. Patterson Dan W., *Introduction to Artificial Intelligence and Expert Systems*, Prentice Hal of India., 1999.
3. Rusell Stuart, Norving Peter, *Artificial Intelligence: A Modern Approach*, Pearson Education 2nd Edition., 2009

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	2	1	2	1	2	3	1	2	3
CO2	3	3	3	2	2	2	2	2	2	2	1	2	2	3	2
CO3	3	2	3	2	2	2	1	1	2	2	3	3	3	2	3
CO4	3	3	2	2	2	2	2	2	2	3	3	3	3	2	2
CO5	3	3	3	2	2	1	1	1	3	2	3	3	1	3	1
Average	**3**	**2.8**	**2.8**	**2**	**2**	**1.6**	**1.6**	**1.4**	**2.2**	**2**	**2.4**	**2.8**	**2**	**2.4**	**2.2**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Computer Graphics and Multimedia

Course Code: A301501

Semester: 5th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the core concepts of computer graphics.
CO2	Recognize various input/output devices used for Computer Graphics.
CO3	Apply graphical programming techniques in two dimensional geometric transformations.
CO4	Represent the 3-D curves and surfaces.
CO5	Learn the importance of viewing and projections.

Course Contents

Section-A

Introduction: What is Computer Graphics, Computer Graphics Applications, Computer Graphics hardware and Software, Two dimensional Graphics primitives: Points and Lines

Point plotting Techniques: Coordinate system, Increment method, Line drawing algorithm: DDA, Bresenham's circle drawing algorithm: Using polar coordinates, Mid point circle drawing algorithms, filled area algorithm: Scan line, Polygon filling algorithms, Boundary filled algorithms.

Point & Positioning devices: light pen, mouse, Tablet, Input technique, positioning technique, and character recognition.

Two Dimensional Geometric transformations: Translation, Scaling, Rotation, Other Transformations Reflection, shear, Homogenous Coordinate System

Clipping: point & line clipping algorithm,

Two Dimensional Viewing: Viewing pipeline, Window to view port transformation, Window to view port mapping

Section-B

Three Dimensional Geometric transformations: Translation, Scaling and Rotation

Three Dimensional Viewing: Viewing pipeline, viewing coordinates, Projection: Parallel, perspective

Representation of 3-D curves and surfaces: Curved lines and surfaces, spline representations, interpolation and approximation splines, parametric continuity conditions.

Bezier curves and surfaces: Bezier curves, properties of Bezier curves, Bezier surfaces B-spline curves and surfaces.

Hidden Surfaces removal: Hidden surface elimination, depth buffer algorithm, scan line coherence algorithm, priority algorithm.

TEXT BOOKS/ REFERENCE BOOKS:

1. Hern & Baker. *Computer Graphics*, 2nd Ed. PHI, New Delhi.
2. Rogers. *Principles of Computer Graphics.* MGH Pub, New Delhi.
3. Foley, Dam Van, Feiner and Hughes. *Computer Graphics Principles and Practice*. Addison-Wesley Pub Company.
4. *Kanetkar Yashwant. "Graphics Programming with C".* BPB Publications, New Delhi

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	1	2	2	2	1	1	2	2	2	2	3	3	2	1
CO2	3	1	2	1	3	2	1	1	2	2	1	2	1	3	2
CO3	3	2	3	2	3	1	2	1	2	3	2	3	2	1	2
CO4	3	3	3	3	2	1	1	1	2	3	2	2	3	1	3
CO5	2	2	1	1	2	1	1	2	2	2	2	3	1	2	1
Average	**2.8**	**1.8**	**2.2**	**1.8**	**2.4**	**1.2**	**1.2**	**1.4**	**2**	**2.4**	**1.8**	**2.6**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Data Communication & Computer Networks

Course Code: A301502

Semester: 5th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the basic concepts of data communications and their interrelationship.
CO2	Recognize the unambiguous networking as it relates to the connection of computers, media, and devices (routing).
CO3	Learn local area networks and wide area networks in terms of characteristics and functionalities.
CO4	Analyze the limitations of typical communication systems.
CO5	Evaluate the performance of a single link, logical process-to-process (end-to-end) channel.

Course Contents

Section-A

Introduction to Computer Networks and its uses, Network categorization and Hardware: Broadcast and point-to-point networks, Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Internetworks, Topologies, Wireless networks.

Network Software: Protocols, Services, network architecture, design issues, OSI Reference model, TCP/IP Reference model, Comparison of OSI and TCP/IP Models. Introduction to Example Networks: Internet, Connection-Oriented Networks – X.25, Frame Relay, ATM.

Data Communication Model, Digital and Analog data and signals, bit rate, baud, bandwidth, Nyquist bit rate, Guided Transmission Media – Twisted Pair, Coaxial cable, Optical fiber; wireless transmission – Radio waves, microwaves, infrared waves; Satellite communication.

Switching: Circuit Switching, Packet Switching; Multiplexing: Frequency Division Multiplexing Time Division Multiplexity, Synchronous and Asynchronom TDM, Modems, Transmission Impairments, Manchester and Differential Manchester encoding, ADSL Versus Cable.

Section-B

Data Link Layer Design issues: Framing, error control, Flow Control, Error Detection and correction; Elementary Data Link Protocols, Sliding Window Protocols; Medium Access Control: Aloha, CSMA protocols, Collision free protocols, Limited Contention Protocols; Wavelength division Multiple access protocol, Digital Cellular, Radio: Global System for Mobile Communication (GSM), Code Division Multiple Access (CDMA), Fiber Distributed Data Interface, Distributed Queue Dual Bus (DQDB).

Network Layer Design issues : Virtual Circuit and Datagram Subnet, Routing Algorithms, Optimality principle, Shortest path Routing, Flooding , Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast and Multi Cast Routing, Routing for Mobile hosts, Routing in Adhoc Networks,, congestion Control Algorithms, General Principals Traffic Shaping, Leaky bucket token bucket, choke packets, Load Shedding.

***References*:**

1. Tanenbaum Andrew s. *Computer Networks*, PHI.
2. Forouzan. *Introduction to Data communications and Networking*. Tata Mc-Graw Hill.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	1	2	1	2	2	2	3	3	2	1
CO2	3	3	2	2	2	2	1	1	3	2	2	3	1	3	2
CO3	2	2	2	3	2	2	1	1	2	2	3	3	2	1	2
CO4	1	1	2	2	1	1	2	2	3	3	2	2	3	1	3
CO5	2	2	2	2	2	3	1	1	2	2	3	2	1	2	1
Average	**2.2**	**2**	**2**	**2.2**	**1.8**	**2.2**	**1.4**	**1.2**	**2.4**	**2.2**	**2.4**	**2.6**	**2**	**1.8**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: SYSTEM SOFTWARE

Course Code: A301503

Semester: 5th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the various Assembly language programming using loading, linking facilities.
CO2	Communicate with Assembler and macro processor.
CO3	Analyze the basics of system programs like editors, compiler, and debugger.
CO4	Create executable program from an object module created by assembler and compiler.
CO5	Develop a code of assembly language programs.

Course Contents

Section-A

Introduction to software processors: elements of assemble language programming; assembly scheme; single pass and two pass assembler; general design procedure of a two pass assembler

Software Tools: Text editor and its design. Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro facility, design of a macro pre-processor.

Interpreters: use of interpreter, pure and impure interpreter

Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Section-B

Compilers: Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs. Basic concepts of an operating system and its functions.

Memory management: contiguous, non-contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.

Processor management: Scheduler, traffic controller, race condition. Information management: Structure and features of file systems, objectives of segmented environment

References:

1. Dhamdhere. *Systems Programming and operating systems*. TMH.

2. Donovan. *System Programming*. MC Graw Hill.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	1	1	2	2	2	1	-	2	2	1	2	3	2	1
CO2	3	1	1	1	2	1	1	1	2	2	2	2	1	3	2
CO3	2	2	2	3	2	1	1	1	1	1	2	2	2	1	3
CO4	3	2	2	3	3	2	-	-	2	2	3	3	3	2	1
CO5	2	3	3	3	2	2	2	2	2	3	3	3	3	3	2
Average	**2.6**	**1.8**	**1.8**	**2.4**	**2.2**	**1.6**	**1.2**	**1.3**	**1.8**	**2**	**2.2**	**2.4**	**2.4**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Programming Using Python

Course Code: 301509

Semester: 5th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the variables, expressions and statements.
CO2	Apply conditional and looping constructs.
CO3	Design and import functions in python programming.
CO4	Learn the basics of Strings and Dictionaries.
CO5	Utilize basic operations on File.

Course Contents

Section-A

Introduction to Python Getting Started: Introduction to Python- an interpreted high level language, interactive mode and script mode.

Variables, Expressions and Statements: Values, Variables and keywords; Operators and Operands in Python: (Arithmetic, relational and logical operators), operator precedence, Expressions and Statements (Assignment statement); Taking input (using raw_input() and input()) and displaying output(print statement);Putting Comments

Conditional constructs and looping: if else statement While, For (range function), break, continue, else, pass, Nested loops, use of compound expression in conditional constructs and looping

Functions: Importing Modules (entire module or selected objects), invoking built in functions, functions from math module, using random () and randint() functions of random module to generate random numbers, composition.

Defining functions, invoking functions, passing parameters, scope of variables, void functions and functions returning values, flow of execution

Section-B

Strings: Creating, initializing and accessing the elements; String operators: +, *, in, not in, range slice [n:m]; Comparing strings using relational operators; String functions & methods:

len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitile, partition, replace, join, split, count, decode, encode, swapcase, Pattern Matching

Lists: Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending, updating and deleting elements; List operations (joining, list slices); List functions & methods: len, insert, append, extend, sort, remove, reverse, pop

Dictionaries: Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, traversing, appending, updating and deleting elements. Dictionary functions & Methods: cmp, len, clear(), get(), has_key(), items(), keys(), update(), values()

Tuples: Immutable concept, creating, initializing and accessing the elements in a tuple; Tuple functions:cmp(), len(), max(), min(), tuple()

Input and Output: Output Formatting, Reading and Writing Files

Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Predefined Clean-up Actions

Text Books:

1. Dawson Michael, *Programming with python*, A users Book Cengage Learning
2. Beazley David, *Python Essential Reference*, Third Edition

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	1	1	3	3	3	3	3	2	1
CO2	2	2	3	3	3	2	-	-	2	2	3	3	1	3	2
CO3	3	2	2	3	3	-	-	-	3	3	2	3	2	1	3
CO4	3	2	2	2	2	1	-	1	3	3	3	2	3	2	1
CO5	2	1	3	3	3	1	2	2	3	3	3	3	2	3	2
Average	**2.6**	**2**	**2.6**	**2.8**	**2.8**	**1.2**	**1.5**	**1.3**	**2.8**	**2.8**	**2.8**	**2.8**	**2.2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Software Engineering

Course Code: A301403

Semester: 5th

L T P

Credits: 05 **4 1 0**

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

CO	Statement
CO1	Understand the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction and deployment.
CO2	Apply techniques for the software lifecycle.
CO3	Gain knowledge about DFDs, Entity Relationship diagrams etc.
CO4	Perform various testing techniques.
CO5	Get knowledge of Software Requirement Analysis (SRS).

Course Contents

Unit - I

Software: Characteristics, Components, Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics &Measurements.

Unit - II

S/W Project Planning: Objectives, Decomposition techniques: S/W Sizing,Problem,based estimation, Process based estimation, Cost Estimation Models: COCOMO Model, The S/W Equation.

Unit – III

System Analysis: Principles of Structured Analysis, Requirement analysis, DFD, Entity Relationship diagram, Data dictionary.

S/W Design: Objectives, Principles, Concepts, Design methodologies: Data design, Architectural design, procedural design, Object ,oriented concepts

Unit – IV

Testing fundamentals: Objectives, principles, testability, Test cases: White box & Black box testing. Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing

Text Books:

1. Pressman S Roger, *Software Engineering, A Practitioner's Approach*, Third Edition,

McGraw Hill, 1992
2. Fairley E.R., *Software Engineering Concepts*, McGraw Hill, 1985.
3. Jalota Pankaj, *An Integrated Approach to Software Engineering*,Narosa Publishing House, 1992.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	1	1	2	2	1	2	-	-	2	2	3	2	2	2	2
CO2	2	3	2	2	2	3	1	-	2	2	3	3	2	3	3
CO3	1	2	2	3	2	2	-	1	1	1	2	2	2	3	1
CO4	3	2	3	1	2	3	-	-	2	2	3	3	3	2	2
CO5	2	2	2	2	3	2	1	-	2	1	2	2	2	3	1
Average	**1.8**	**2**	**2.2**	**2**	**2**	**2.4**	**1**	**1**	**1.8**	**1.6**	**2.6**	**2.4**	**2.2**	**2.6**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Workshop on PHP

Course Code: A301407

Semester: 5th

L T P

Credits: 02 **0 0 4**

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

CO	Statement
CO1	Grasp the general concepts of PHP scripting language for the development of Internet websites.
CO2	Understand the basic functions of MySQL database program.
CO3	Analyze the relationship between the client side and the server side scripts.
CO4	Read and process data in a MySQL database.
CO5	Develop a final project using the learned techniques.

Course Content

List of Experiments

Note: Install wamp on window based systems to make it virtual server to run PHP.

1. Create a basic web page to show use of head, title, and body tag.
2. Create a web page to show use heading and text formatting tags.
3. Create a web page to show use img, ul, ol and anchors.
4. Create a web page to show use tables and div tags.
5. Create a web page using class, id and inline styles.
6. Create a web page to create a form.
7. Create a web page to show an alert using java script.
8. Show the use of get Element by Id in java script.
9. Create a web page using variables, loop and Conditions in java script.
10. Create a web page using Switch in java script.
11. Create a web page to show use of jquery.
12. Create a web page to implement get & post in ajax.
13. Create a web page to print your name using PHP.
14. Create a web page to show use of all data types in PHP

15. Create a web page to show use loops & Conditional Statements.
16. Create a web page to show use arrays in PHP.
17. Create database and tables in MySQL.
18. Fetch and display data from MySQL table in a web page using PHP.
19. File uploads to server using PHP.
20. Working with cookies and sessions.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	1	2	3	3	3	3	3	2	1
CO2	2	3	2	3	3	2	-	-	3	2	3	3	1	3	2
CO3	2	2	2	3	2	2	-	-	2	2	3	3	2	1	3
CO4	3	3	2	3	2	3	1	2	3	3	3	3	3	2	1
CO5	3	2	2	3	3	3	2	1	3	2	3	2	2	3	2
Average	**2.6**	**2.6**	**2**	**3**	**2.6**	**2.4**	**1.3**	**1.6**	**2.8**	**2.5**	**3**	**2.8**	**2.2**	**2.2**	**1.8**

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Software Lab (Programming Using Python)

Course Code: 301510

Semester: 5th

L T P

Credits: 04 **0 0 8**

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

CO	Statement
CO1	Develop solutions for a range of problems using python programming.
CO2	Implement the basic conditional and looping constructs.
CO3	Write the code to implement List and tuple in Python programming tools.
CO4	Use the various algorithms in python programming.
CO5	Develop solutions of real time problems.

Course Contents

List of Experiments:

PROGRAM 1: Hello World

PROGRAM 2: Add numbers and Concatenate strings

PROGRAM 3: Input from user

PROGRAM 4: Loops

PROGRAM 5: If-Else - Conditional Checking

PROGRAM 6: Functions

PROGRAM 7: Math library

PROGRAM 8: Strings

PROGRAM 9: Exceptional Handling

PROGRAM 10: Random Numbers/String

PROGRAM 11: Demo of Data Structure - List

PROGRAM 12: Demo of Data Structure - Dictionary

PROGRAM 13: Demo of Data Structure - Touple

PROGRAM 15: Command Line Argument

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	-	1	3	2	3	3	3	2	3
CO2	3	2	3	2	3	-	1	1	3	3	3	3	2	1	2
CO3	2	3	3	3	2	1	-	-	2	3	3	3	2	3	3
CO4	3	3	3	3	2	1	1	1	3	3	3	3	1	2	2
CO5	2	2	3	3	3	2	2	2	3	3	3	3	3	3	2
Average	2.6	2.6	3	2.6	2.6	1.5	1.3	1.2	2.8	2.8	3	3	2.2	2.2	2.4

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Course Name: Industrial Training/Internship (6 Months)

Course Code: A301601

Semester: 6th

Credits -02

L	T	P
0	0	0

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

CO	Statement
CO1	Become master in one's specialized technology.
CO2	Update oneself with all the latest changes in technological world.
CO3	Communicate efficiently.
CO4	Analyze and understand the environment of the organization.
CO5	Develop to cognizance of the importance of management principles.

The mapping of PO/PSO/CO attainment is as follows:

PO/PSO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P012	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	3	2	3	3	3	3	3	1	2
CO2	2	3	3	3	3	3	2	3	3	3	3	3	1	2	3
CO3	3	3	2	3	2	3	2	3	3	3	3	3	2	3	2
CO4	3	3	3	3	3	2	2	2	3	3	3	3	3	1	3
CO5	3	3	2	2	3	2	3	3	3	3	3	3	2	3	2
Average	2.8	3	2.6	2.8	2.8	2.4	2.4	2.6	3	3	3	3	2.2	2	2.4

The Correlation levels are: "1" – Low Correlation, "2" – Medium Correlation, "3" – High Correlation and "-" indicates there is no correlation.

Total Number of Course	**39**
Number of Theory Course	**28**
Number of Practical Course	**11**
Total Number of Credits	**170**

Annexure-4

ACADEMIC INSTRUCTIONS

Attendance Requirements

A student shall have to attend 75% of the scheduled periods in each course in a semester; otherwise he / she shall not be allowed to appear in that course in the University examination and shall be detained in the course(s). The University may condone attendance shortage in special circumstances (as specified by the Guru Kashi University authorities). A student detained in the course(s) would be allowed to appear in the subsequent university examination(s) only on having completed the attendance in the program, when the program is offered in a regular semester(s) or otherwise as per the rules.

Assessment of a course

Each course shall be assessed out of 100 marks. The distribution of these 100 marks is given in subsequent sub sections (as applicable).

	Internal (50)						**External (50)**	**Total**
Components	**Attendance**	**Assignment**			**MST 1**	**MST2**	**ETE**	
		A1	A2	A3				
Weightage	10	10	10	10	30	30	50	
Average Weightage	10	10			30		50	100

Passing Criteria

The students have to pass both in internal and external examinations. The minimum passing marks to clear in examination is 40% of the total marks.