DEVI AHILYA VISHWAVIDYALAYA, INDORE

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES

CURRICULUM (SCHEMES)

&

COURSE OF CONTENTS offered in

2018 –2019

MCA 6 YEAR (BCA 3Yrs + MCA 3Yrs) PROGRAMME

Name of the Program: MCA (6Yrs.) Integrated Program

Programme Specific Outcomes

The MCA (6 years) is the only Program of its kind in India. The students undergo rigorous training, which moulds them into highly competent and focused professionals. In a period of five and a half years a student studies a total of 57 subjects. The course structure is designed keeping in mind the overall development of the student. The students have to maintain a high standard of academic performance throughout the course. The classroom learning is complemented by practical experiences in the industry. The course includes compulsory project development at graduation level.

PSO1: A project is also included in the curriculum for the post graduate degree to supplement detailed studies in advanced topics such as Simulation and Modeling, Advanced Database Management and Information Technology Project Management.

PSO2: Experimental Learning is Learning by Experience. Philosophy is the cornerstone approach of IIPS. The fundamental tools and functional knowledge is developed through a carefully coordinated sequence of study in the first three years of the MCA programme.

PSO3: The next three years emphasize on refining this journey with practical exposure. The MCA curriculum includes project work that requires students to confront the actual challenges and dynamics faced by real companies making crucial decisions. Knowledge acquired in the classroom is bolstered with techniques of the workplace.

PSO4: Entrepreneurial Mindset Being able to think out of the box is essential in today is marketplace. In the MCA program, students also learn how to manage change and solve problems beyond the limitations of traditional paradigms. Equipped with this entrepreneurial tool kit, MCA professionals can organize and manage new ventures or provide added value to their employers.

PSO5: The major thrust is on giving the students a sound background in three components namely, computing, business functioning and mathematics fields, relevant to information technology. A strong laboratory component as a part of the curriculum, along with theory enables the students to learn concepts of Data base management system, Programming languages, computer network, Data structure, Artificial intelligence, System programming, Computer architecture etc.

PSO6: Advanced knowledge in Enterprises resource planning, Enterprises computing technique, network security, Compiler design, Soft-computing, Bioinformatics, Managerial economics, Cloud computing, design Pattern etc.

PSO7: Ability for higher education and research in the areas of Students have ability to do research in different area of computer science such as VLSI, Mobile computing, Artificial intelligence, networks etc.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA VISHWAVIDYALAYA, INDORE
SCHEMES OF EXAMINATION FOR MCA 6 Yrs (BCA III yr) PROGRAMME
(Subject to Revision)

Semester V

Code	Subject	L	T	P	C
IC-501	Internet and Web Programming	3	1	0	4
IC-502	System Programming	3	1	0	4
IC-503	JAVA Programming	3	1	0	4
IC-504	Computer oriented Numerical Methods	3	1	0	4
IC-505	Organization Behavior	3	1	0	4
IC-506	Internet and Web Programming Lab	0	0	4	2
IC-507	JAVA Programming Lab	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

Semester VI

Code	Subject	L	T	P	C
IC-601	Computer Graphics	3	1	0	4
IC-602	Human Computer Interface	3	1	0	4
IC-603	Unix And Shell Programming	3	1	0	4
IC-604	System Analysis & Design	3	1	0	4
IC-605	Project				4
IC-606	Unix And Shell Programming Lab	0	0	4	2
IC-607	Computer Graphics Lab	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA VISHWAVIDYALAYA, INDORE SCHEMES OF EXAMINATION FOR MCA 6 Yrs (IV yr) PROGRAMME

Semester VII

Code	Subject	L	T	P	C
IC-701	Design & Analysis of Algorithms	3	1	0	4
IC-702	Computer Architecture	3	1	0	4
IC-703	Advance Java	3	1	0	4
IC-704	Operating System	3	1	0	4
IC-705	Analog Electronics	3	1	0	4
IC-706	Advance Java Lab	0	0	4	2
IC-707	Design & Analysis of Algorithm Lab	0	0	4	2
	Comprehensive Viva				4
					28

Semester VIII

Code	Subject	L	T	P	C
IC-801	Computer Networks	3	1	0	4
IC-802	Theory of Computation	3	1	0	4
IC-803	Advance Database Management Systems	3	1	0	4
IC-804	Software Engineering	3	1	0	4
IC-805	Optimization Techniques	3	1	0	4
IC-806	Computer Network Lab	0	0	4	2
IC-807	Advance Database Lab	0	0	4	2
	Comprehensive Viva				4
					28

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA VISHWAVIDYALAYA, INDORE
SCHEMES OF EXAMINATION FOR MCA 6 Yrs(V yr)PROGRAMME (Subject to Revision)

Semester IX

Code	Subject	L	T	P	C
IC-901	Object Oriented Analysis and Design	3	1	0	4
IC-902	Compiler Design	3	1	0	4
IC-903	Network and Information Security	3	1	0	4
IC-904	Artificial Intelligence	3	1	0	4
IC-905	Bioinformatics	3	1	0	4
IC-906	Project				4
IC-907	Artificial Intelligence Lab	0	0	4	2
	Comprehensive Viva				4
					30

Semester X

Code	Subject	L	T	P	C
IC-1001	Data Mining and Warehousing	3	1	0	4
IC-1002	Parallel Processing and Distributed Computing	3	1	0	4
IC-1003	Enterprise computing Technique	3	1	0	4
IC-1004	Managerial Economics	3	1	0	4
IC-1005	Elective I	3	1	0	4
IC-1006	Enterprises Computing Technique Lab	0	0	4	2
	Comprehensive Viva				4
					26

Elective I

Multimedia Computing
Software Testing & Quality Assurance
Principal of Programming Language

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA VISHWAVIDYALAYA, INDORE SCHEMES OF EXAMINATION FOR MCA 6 Yrs (VI yr) PROGRAMME (Subject to Revision)

Semester XI

Code	Subject	L	T	P	C
IC-1101	Wireless and Mobile Computing	3	1	0	4
IC-1102	Enterprise Resources Planning	3	1	0	4
IC-1104	Elective II	3	1	0	4
IC-1105	Research Methodology & Practices	3	1	4	6
IC-1106	Wireless and Mobile Computing Lab	0	0	4	2
	Comprehensive Viva				4
					24

Elective II

Cloud Computing
Design Patterns
Image Processing

Semester XII

Code	Subject	L	T	P	C
IC-1201	Project				24

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

I SEMESTER

2018 –2019

Code	Subject	L	T	P	C
IC-101	Mathematics-I	3	1	0	4
IC-102	Physics-I	3	1	0	4
IC-103	Fundamentals of Programming using C	3	1	0	4
IC-104	English & Communication Skills	3	1	0	4
IC-105	Computer Fundamentals	3	1	0	4
IC-107D	C programming Lab	0	0	4	2
IC-110B	Computer Fundamentals lab	0	0	4	2
IC-108	Comprehensive Viva	0	0	0	4
					28

IC-101
MATHEMATICS-I

Course Outcomes:

CO1: Understand basic concepts of Partial differentiation, Maxima & Minima of the function, convergence and divergence of the series.
CO2: Solve mathematical problems based on the course material.
CO3: Develop mathematical skills and methods appropriate for students in the computer science.
CO4: Understand more advanced mathematical courses.

Course Contents:

UNIT I
Differential Calculus: Successive differentiation, Leibnitz's theorem, Expansion of functions, Maclaurin's theorem, Taylor's theorem, Indeterminate forms.

UNIT II
Tangents and Normal, curvature, Asymptotes.

UNIT III
Partial Differentiation: Euler's theorem on homogeneous functions, Mean value theorem and Taylor's theorems of two variables.
Application: Maxima and minima of functions of two and more variables, Lagrange's method of undetermined multipliers.

UNIT IV
Integral Calculus: integration of irrational, and Transcendental functions, Reduction formulae, Integral as the limit of a sum, summation of series.

UNIT V
Convergence and Divergence: Convergence and Divergence of infinite series, Definition and various tests.

Text Books:
1. Gorakh Prasad, Integral Calculus.
2. Gorakh Prasad, Differential Calculus

Reference Books:
1. Shanti Narayan, Differential Calculus.

IC-102
PHYSICS-I

Course Outcomes:

CO1: Understand basic concepts of physics such as circuit elements electromagnetic induction, capacitors and some laws related to passive elements.
CO2: Develop and apply knowledge and understanding of physics.
CO3: Develop the knowledge and skills for more advanced learning in physics.

Course Contents:

UNIT I

Static and current Electricity: Charge, coulomb's law, Electric field Intensity, Dipole fields. Electric Potential, flux of electric field, Gauss's law and its applications, Torque on a dipole in uniform Electric field.

Growth and Decay of current is R-L and R-C circuits, decay constants, A.C currents A.C. with R-L, R-C and L-C-R circuits, series and parallel resonant circuits, Q-factor and Band Width.

UNIT II

Capacitors: Capacitors, factors affecting capacity, types of capacitors, series and parallel connection of capacitors, Capacity of Parallel Plate Condenser, Capacity of Parallel Plate Condenser when dielectric is filled partially, Energy stored in a capacitor, Redistribution of charge when two conductors are connected by a conductor wire. Dielectrics and Dielectric Polarization.

UNIT III

Motion of charged particles in Electric and Magnetic fields: E as an Electric field, Electron gun, Linear Accelerator, E as a deflecting field, C.R.O and sensitivity of C.R.O, Transverse Magnetic field, Principles of Cyclotron.

UNIT IV

Basic Semiconductor Physics: Intrinsic and extrinsic semiconductors. Donor and Acceptor levels, P-N Diode, Explanation of PN diode with Forward and Reverse Bias conditions, Breakdown of P-N Diode, Zener Diode.

UNIT V

Applications of Diodes: Full Wave Rectifier, Bridge Rectifier and Qualitative concept of Filters.

Bipolar Transistors: PNP and NPN Transistors-Characteristics of a Transistor in Common Base and Common Emitter mode, Current amplification factor.

Text Book

1. Unified Physics --R.P.Goyal

Reference Books:

1. Basic Electrical circuits- Volume-I--B. L. Thareja
   Basic Electronics--B. L. Thareja
2. Physics part –II- Resnick and Halliday

IC-103
FUNDAMENTALS OF PROGRAMMING USING C

Course Outcomes:

CO1: The principle objective of this course is to develop logic of problem solving and learn basics of programming methodologies.
CO2: Develop the program development logic for the given problem.
CO3: Recognize and understand the syntax and construction of C code.
CO4: Hands on experience of procedural language programming.
CO5: Hands on experience of steps involved in compiling, linking and debugging C code.
CO6: Apply all the concepts that have been covered in the theory course.

Course Contents:

UNIT I
Introduction to Programming Language & Problem solving Approach: Development of flow charts & Algorithms, Why Programming Language? Program development steps, Programming language classification, Translators, Program design techniques. History of C Language, Feature of C Language, Why is C Language Popular? Structure of C Program, A Sample C Language Program. Errors, Compilation and Execution of C Programs and Exercise.

UNIT II
Useful terms of Language: Data types, The C character set, Constants, Variables, Keywords, C Instructions, Type Modifier, Storage class specifies, Storage classes in C and Exercises. Operator Expressions and Assignment Statements: Arithmetic Operators, Relational and Logical Operators, Increment and decrement Operators, Assignment Operators and Expressions, Conditional Expression, Precedence and order of Evaluation and Exercises.

UNIT III
Control Structure in C: Decision Control Structures, Loop Control Structures, Conditional Statements and Exercises, break Statement, The continue Statement. Console Input and Output: Introduction to Input / Output, Unformatted and Formatted Input / Output Function.

UNIT IV
Array: Introduction to Array, One Dimensional Array, Multidimensional Array, Initialization, Declaration, Storage and Access Mechanisms on Array and Exercises. String Manipulation: Introduction to Strings, Two Dimensional Array of characters. Function: Introduction to Functions, Function Declaration and Prototypes, Function Definition, Call by Value and Call by Reference, return statement, exit() function, Function with arguments, Calling Function with Array, Command Line, Arguments, Recursion in Function.

UNIT V
Structure: Structure Definition, Giving Values to members, Structure initialization, Comparison of Structure variables, Array of Structure, Array within Structures, Structures within Structures, Passing Structures to Functions, Why use Structure, Features and Uses of Structures. Union: Union Definition and Declaration, Accessing a union Member, Union of Structures, Initialization of a Union Variable, Use of Union, Use of User Defined Type Declarations.

Text Books:

1. Let us C, By Y.P. Kanitkar, B.P.B. Publications

Reference Books:

1. C -The Complete Reference, Tata Mcgraw Hill Publications
2. C-How to Program, By Deitel & Deitel
3. Programming in C & C++, By S.S. Khandare, S. Chand Publications

IC-104
ENGLISH & COMMUNICATION SKILLS

Course Outcomes:

CO1: The principle objective of this course is to enable students to improve both their ability to communicate and linguistic competence in English language.
CO2: Knowledge of correct usage of English with an emphasis on reading and writing skills.
CO3: Practice writing skills at sentence and paragraph levels with correct grammatical structures.
CO4: Practice and learn English speaking skills to communicate in daily situations effectively.

Course Contents:

UNIT I

Meaning and Definition of communication, Process of Communication. Objectives and functions of communication.

UNIT II

Components of effective communication, 4C's of effective communication. Group discussion. Listing skills, types of skills.

UNIT III

Types of communication – verbal, non-verbal, written and oral communication. Report writing. letter writing

UNIT IV

Communication barriers, formal and informal channels of communication. Public speaking.

UNIT V

Practical Training :
Making effective presentation

Reference Books:

1. C. S. Raydu, Communication Skills.
2. Andal N., Communication Models.
3. Keval J. Kumar, Communication Barriers.
4. Dennis Maquail, Effective Communication.

IC-105
COMPUTER FUNDAMENTALS

Course Outcomes:

CO1: The principle objective of this course is to students understand basics of computer and its working.
CO2: Knowledge of basic units and model of computer.
CO3: understand number system for data representation in computer.
CO4: Understand basics of Operating system and DBMS.
CO5: Learn working with MS Office and Internet.

Course Contents:

UNIT I

Introduction to Computer: Definition, Characteristics, functions and applications of a Computer, Components of a Computer: Hardware and Software, Block diagram of a computer: Input devices, Output devices, CPU, Memory. Classification of computer, generation of computer. Data representation and computer software: Number system-Binary, Decimal, Octal, Hexadecimal and its conversion. Computer software: system software and application software. Computer languages: Machine, Assembly, High level and Fourth generation languages

UNIT II

Introduction to Operating System: Definition and functions of an Operating System, Type and classification of Operating Systems.. Introduction to Data Base Management System: Introduction, Quality of information, What is Database, DBMS? Why a database, DBMS? Types of DBMS

UNIT III

Microsoft office environment: Microsoft Word: Working with Word, Typing and Editing, Formatting Text, Page design and layout, adding tables, using graphs, mail merge Microsoft Excel: Working with excel, entering data, formatting, customizing workplace, calculation in worksheet, adding charts, advanced features of excel. Microsoft–PowerPoint: Working with PowerPoint, Adding Text, Including Multimedia, Customize PowerPoint, Microsoft Access: Creating database, addition and deletion of records, searching, sorting and indexing the records, creating tables and records, advance features of Access.

UNIT IV

Internet and World Wide Web: Introduction, Internet access, Internet basics, Internet protocols, Internet addressing, Web pages and HTML, Web browser and search engines, Electronic mail. Computer Security: Physical access restriction, Passwords, Firewalls, Cryptography, Computer virus, Bombs and worms. Antivirus software. MSDOS: DOS features, External and Internal Commands, Managing disks, advanced command techniques, working with batch programs. Microsoft Windows and its environment

UNIT V

Introduction to Multimedia: Introduction, Multimedia in entertainment, Multimedia in software training, Multimedia in education training, Multimedia server and databases, Multimedia tools.

Text Books:

1. Alexis Leon, Introduction to Computer
2. Alexis Leon, Introduction to Information Technology

Reference Books:

1. P.K.Sinha ,Fundamentals of computers .

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

II SEMESTER

2018 – 2019

Subject Code	Subject Name	Credits
IC-201	Mathematics – II	4
IC-202	Chemistry & Environmental Science	4
IC-203	Basic Electronics	4
IC-204	Object Oriented Programming Using C++	4
IC-205	French	4
IC-206	Lab Viva (Electronics)	2
IC-207	Lab Viva (Computer)	2
	Comprehensive Viva	4
Total		**28**

IC-201
MATHEMATICS-II

Course Outcomes:

CO1: The principle objective of this course is to understand advanced mathematical concepts and techniques.

CO2: Understand basic concepts of curve tracing, rectification, groups, cosets, homomorphism and isomorphism.

CO3: Solve mathematical problems based on the course material.
develop mathematical skills and methods appropriate for students in the computer science

Course Contents:

UNIT I

Curve tracing: Introduction, pre-requisites, for the curve tracing, maxima & minima, concavity and convexity of the curve, Singular points, asymptotes, symmetry, tangents, Main points of tracing the curve in Cartesian and polar form, some problems on curve tracing.

Improper integral: Improper Integral definition, types of the improper integral, their convergence, Beta Gamma function and their properties, some important deductions followed by some numerical problems

UNIT II

Rectification: Methods and formula for finding out the length of curve in Cartesian and polar form, numerical, intrinsic equation. Derivation of formula for finding the area under plane curve, followed by some problem solving.

Multiple integrals: Integration of function of two and three variables. Double and triple integral. Drichlet integral. Change of order of integration. Use of double and triple integral in finding the area and volumes of Cartesian curves.

UNIT III

Groups and their general properties : Binary Operation, algebraic structure, definition and example of groups, examples. Order of an element in a group. General properties of a group. Modulo System. Subgroup, complex subgroup, definition and examples, algebra of complexes. Criterion for a complex to be a subset of a group. Union and intersection of subgroups. Cyclic group and subgroups generated by a subset of a group. Theorems generating system of a group

UNIT IV

Coset and coset decomposition : Coset definition, properties of cosets. Cosets decomposition. Partioning of a group. Relation of congruency modulo in subgroups. Lagrange theorem with its corollaries. Index of a subgroup in a group. Fermat and eular theorems. Multiplication of two subgroups. Order of the product of subgroup of finite order.

Normal subgroup & quotient group: Definition, example and theorems on normal subgroup quotient groups. Cener and normalize of a group. Conjugate, self-conjugate elements of different groups.

UNIT V

Homomorphism and isomorphism of groups : Definition of homomorphism of groups, examples, various types of homomorphism, auto-homomorphism, inner automorphism, theorem, maximal normal subgroup. Permutation, Transformation groups and Cayley's thermo.

Matrix : Meaning of matrices,addition,scalar multiplication,product of matrix,adjoint and inverse.Elementary Transformations.Rank of matrix,Normal forms.Application of matrix for solving system of Linear equations.

Text Books:

1. Gorakh Prasad, Integral Calculus.

Reference Books:

1. Shanti Narayan, Differential Calculus.
2. R.B. Thakur, Advanced Calculus.
3. H.K. Pathak, Calculus For IInd Yr.

IC-202
CHEMISTRY & ENVIRONMENT SCIENCE

Course Outcomes:

CO1: learn chemistry of various engineering materials and processes, their importance, properties, testing, structure-property relationship, tailoring and their applications in various technologies.

CO2: understand and develope aware with various environmental issues and pollution and control studies in modern society for sustainable development

Unit –I High Polymer:

Introduction, types and classification of polymerization, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, Nylon 6, Nylon 6:6, Terylene, Phenol formaldehyde Resin.

Unit –II Energy:

Sources of Energy: Renewable & Non Renewable, Fossil fuel, Biomass, Geothermal, Hydrogen, Solar, Wind, Hydal, Nuclear energy.

Unit –III Ecosystem:

Segments of Environment: Atmosphere, Hydrosphere, Lithosphere, biosphere, Cycles in Ecosystem – Water, Carbon, Nitrogen, Biodiversity: Threats and conservation.

Unit –IV Air Pollution & Sound Pollution:

Air Pollution: Air pollutants, classification, (Primary & Secondary Pollutants) Adverse effects of pollutants, Causes of Air pollution chemical, Greenhouse effect, Ozone layer depletion, Acid rain. Sound Pollution: Causes, Controlling Measures, Effects of sound pollution.

Unit –V Water Pollution & Sound Pollution:

Water Pollution: Pollutants in water, Adverse effects, Treatment of Domestic & Industrial water effluent.

Society, Ethics & Human values: Impact of waste on society. Solid waste management (Thermal, Plastic, Agriculture, Domestic and E-waste), Ethics and moral values, Ethical situations, Objectives of ethics and its study, Preliminary studies regarding Environmental Protection Acts.

Text Book:

1. "Energy Environment Ecology and Society" By Dr. Surinder Deshwal Dhanpat Rai Publication

References:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3. Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6. BK Sharma, "Environmental Chemistry" ; Goel Publ. House.

IC-203
BASIC ELECTRONICS

Course Outcomes:

CO1: The principle objective of this course is to introduce students with basic concepts of electronics.
CO2: Understand basic components of circuits.
CO3: Understand the use of diodes as power supply rectifiers.
CO4: Understand the operation of transistors as switching circuits.

Course Contents:

UNIT I

Basic Components: Circuit Symbols, Working Principle, Classification according to construction, Specification, and applications of passive components-Resistors & Color coding, Inductors, Transformers, Switches, Relays (Electromagnetic), Thermistor, LDR, Microphone and Loudspeakers.

UNIT II

Capacitors:- Capacitance, Capacitor Specifications, Classification of Capacitor-Fixed(Mica, Paper, Ceramic, Plastic, Electrolytic etc), Variable capacitor (Trimmer, Padder, Gang), Stray capacitance, Leakage Resistance, Testing of Condenser, Area of Application, Problem related to Electrical Energy Storage.

UNIT III

Semiconductors: Conductors, Semiconductors and Insulators, Classification on the basis of Band Theory, Intrinsic and Extrinsic Semiconductors, Diode current equation (Derivation not required), Drift & Diffusion.

UNIT IV

P-N Junction-Forward and reverse bias of Diode. Concept of recombination of carriers, Temperature variation of Forward and Reverse Current through the P-N Junction. Characteristics of Forward & Reverse Bias Diode, Dynamic and Statics Resistances, Voltage dependent Junction Capacitance of a P-N Junction

UNIT V

Special Diodes: Zener Diode, its construction and characteristics, Temperature coefficient of Zener Diode, Zener Diode as Voltage Regulator, Schottky Diode, Power Diode, Tunnel Diode, LED, Solar Cell, Photodiodes.

Text Books:

1. Boylstad, Electronics devices and circuit theory.
2. Milliman J. Halkias C, Integrated electronics

Reference Books:

1. Malvino A.P., Electronics principal
2. B.L. Theraja, Electrical Technology
3. V.K. Mehta Principal of electronics.

IC-204
OBJECT ORIENTED PROGRAMMING USING C++

Course Outcomes:

CO1: The principle objective of this course is to help students to gain a better understanding of Object Oriented design and program implementation by using Object Oriented language features.
CO2: Understand object-oriented programming features in C++,
CO3: Apply these features to program design and implementation,
CO4: Understand object-oriented concepts and how they are supported by C++,
CO5: Gain some practical experience of C++,
CO6: Understand implementation issues related to object-oriented techniques,
CO7: Build good quality software using object-oriented techniques

Course Contents:

UNIT I

Principle of Object Oriented Programming, Object-Oriented Terminology, OOP Paradigm, Basic concept of OOP, Benefits of OOP, Application of OOP.
Introduction of C++: Tokens, Keywords, Identifier and constants, Operator, Data Type, Variable Manipulator, Expression and Control structure.

UNIT II

Classes and Function in C++ :
Class: Defining Classes in C++, Classes and Encapsulation, Member functions, Instantiating and Using Classes, Access specifiers, Static Class Members.
Constructor and Destructor: Use of Constructors, Multiple Constructors, Types of constructor, Using Destructors to Destroy Instances.
Function: Function Introduction, Main function, Function Prototyping, inline function, friend function.

UNIT III

Inheritance & Polymorphism: Overview of Inheritance, Defining Base and Derived Classes, Constructor and Destructor Calls, Virtual base classes, Abstract classes.
Overview of Polymorphism
Operator & Function Overloading: Operator Overloading, Working with Overloaded Operator Methods, Introduction to Function overloading.

UNIT IV

Pointer and Virtual Function: Introduction of Pointer, Dynamic memory allocation, Pointers to object, this pointer, Pointers to derived classes, Virtual Functions, Pure virtual function.

UNIT V

Working with files in C++, Exceptions Handling and Templates:
Files: Standard Streams, Manipulators, Unformatted Input and Output, File Input and Output.
Exceptions: Basics of Exception handling, Exception handling mechanism.
Templates: Template Overview, Customizing a Template Method, Standard Template Library Containers.

Text Books:

1. The Complete Reference - C++, Tata Mcgraw Hill

Reference Books:

1. E. Balagurusamy, Object-Oriented Programming with C++
2. Yashwant Kanitkar ,Let us C++.

IC-205
FRENCH

Course Outcomes:

CO1: The principle objective of this course is to give the students the basic knowledge of French language

CO2: Make students understand vocabulary and grammar of French language.

CO3: Introduce some aspects of France, its people and culture.

CO4: Emphasize and develop four linguistics skills.

Course Contents:

Unit I A spring in Paris:

Lesson 1:-Meeting

Lesson 2:-Sympathies

Lesson 3:-Tastes and preferences

Lesson 4:-Agreements and disagreements

Lesson 5:-Surprises

Unit II Adventure in Bourgogne:

Lesson 1:-Countryside house

Lesson 2:-Meals in Broussac

Unit III Grammare:

Articles,Nouns Adjectives,Verbs,Interrogatives,Negatives,Conjugations,Present tense

Unit IV Communication:

Introduce oneself,Invitation writing and accepting invitation,describe the person

Unit V Vocubulary:

Monuments,public places in Paris,professions,different types of houses,etc.

Reference Books: 1. Apprenons le francais 2

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

III SEMESTER

2018 – 2019

Sub. Code	Sub. Name	L	T	P	C
IC-301	Probability and Statistics	3	1	0	4
IC-302	Financial Accounting	3	1	0	4
IC-303	Digital Electronics	3	1	0	4
IC-304	Data Structure and Algorithms	3	1	0	4
IC-305	Digital Computer Organization	3	1	0	4
IC-306	Digital Electronics Lab	0	0	4	2
IC-307	Data Structure and Algorithms Lab using C++	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

IC – 301
PROBABILITY AND STATISTICAL METHODS

Course Outcomes:

CO1: The principle objective of this course is to make student aware about the Probability and Statistical Methods for research and real life data analysis.
CO2: Understand basic concepts of Probability and Statistical Methods for data analysis.
CO3: Learn Hypothesis testing.
CO4: Learn the application of different tests such as Chi-square, T & F statistic.

Course Contents:

UNIT 1

Theoretical Probability Distributions: Binomial Probability distribution, Poisson Probability distribution, Normal Probability distribution.

Estimation: Unbiased-ness, consistency, efficiency and sufficiency , minimum variance unbiased estimator , Cramer-Rao inequality and its application , Maximum Likelihood estimator.

Testing of Hypothesis, Simple and Composite hypothesis, Test of significance for Samples, Test for single proportion and for difference of proportion. Test of significance for single mean , Test of significance for difference of means.

UNIT II

Interval estimation: Confidence Interval and Confidence limits, Confidence limits for large samples.

Test of significance: Procedure for testing of Hypothesis, Test of significance for large samples, test for single proportion and for difference of proportions, Test of significance for single mean, Test of significance for difference of means.

UNIT III

Test of significance for small samples: Concept of Chi-square, t and F- statistics, Test for Chi-square distribution, to test goodness of fit, to test independence of Attributes, to test the homogeneity of correlation coefficients.

Test based on t- distribution: t-test for single mean, difference of means , paired t- test, t-test for testing significance of an observed sample correlation coefficient.

UNIT IV

Test based on F- distribution: Test for equality of population variance, Test for testing the significance of an observed multiple correlation coefficients.

Non parametric test: sign- test, median test, run test, Wilcox on signed rank test .

UNIT V

Analysis of variance and design of experiments: One -way and two- way classification with one observation per cell, Design of experiments, completely randomized design randomized block design and Latin square design.

Text Book:

1. S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical statistics, S. Chand sons.

Reference Books:

1. S.C. Gupta & V.K. Kapoor : Fundamentals of Applied statistics, S. Chand sons.
2. A.M.Gun, M.K.Gupta, B Dasgupta: An outline of statistical theory(Volume 1)
3. Kapoor and SINTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

IC-302
FINANCIAL ACCOUNTING

Course Outcomes:

CO1: The principle objective of this course is to give an in-depth knowledge of all business transactions and how they should be recorded, classified & interpreted to get a meaningful judgment of viability & profitability of the industry.

CO1: Prepare a set of financial statements for various forms of businesses and nonprofit entities.

CO2: Develop an ability to apply accounting concepts, principles and practices.

CO3: Hand on experience with the basic tools for analyses of financial statements.

Course Contents:

UNIT I Accounting Structure:
Introduction and purpose of accounting and uses of accounting information & basic accounting concepts. Process of accounting, Journal, Ledger & Trial balance, Profit and Loss A/C,Balance Sheet

UNIT II
Introduction to Cash and fund flow Analysis of financial statements & Financial Ratio.

UNIT III
Introduction to cost accounting : Elements of cost , Cost determination , Direct and Indirect cost , Cost centers & cost units , the behavior of cost.

UNIT IV
Capital Structure: Meaning of capital Structure Different Capital Structure Theories.
Time value of money: Introduction to various sources of finance Leverages-Meaning of leverage, Significance of operating & financial Leverage.

UNIT V
Working Capital Management: Concept of Working Capital, Management of cash Management of Inventories, Management of Account Receivable Management, Accountants Payable Over Trading & Under Trading.

Text Book :
1. T.S. Grewal, Introduction to accountancy, S. Chand & co. Ltd.,
2. Dr. S. N. Maheshwari , Financial Management: Principles & Practice

Reference Books:
1. Financial Accounting By Mangal Mehta
2. Financial Management By Shukla Grewal

IC-303
DIGITAL ELECTRONICS

Course Outcomes:

CO1: The principle objective of this course is to understand basic concepts of digital logic, its operations, principles and applications.

CO2: Understand number systems and codes, and Boolean Algebra

CO3: Understand TTL and CMOS circuit characteristics, followed by logic devices such as flip-flops, code converters, counters, multiplexers, and registers.

Course Contents:

UNIT I

Binary Systems and logic circuits. Decimal, Binary, Octal, Hexadecimal numbers and their inter conversions. ASCII, Gray, Excess-3, 8-4-2-1,Error detecting and BCD codes. Logic Gates. Boolean algebra. Demorgon's theorem. Binary addition and subtraction. Unsigned Binary numbers, Signed binary numbers. 2's complement representation and its arithmetic.

UNIT II

Circuit analysis and design.

Boolean laws and theorems. Sum of Product and Product of Sum simplification. Two, three and four variable karnaugh map. NAND and NOR implementation. Other two level implementation. Don't care conditions.

UNIT III

Combinational circuits.

Design procedure. Half adder, full adder, adder-subtractor circuit. Code converters. Various logic circuits. Multilevel NAND circuit. Multilevel NOR circuit.

Data Processing circuits.

Multiplexers, demultiplexers, decoders and encoders. Binary parallel adder, look ahead carry generator, magnitude comparator, ROM, PROM, PLA.

UNIT IV

Sequential circuit.

Flip-flops, triggering of flip-flops. Analysis of clocked sequential circuits, state reduction and assignment, flip-flop excitation tables.

UNIT V

Registers, counters and integrated circuits.

Design of counters, registers, shift registers. Ripple counters, synchronous counters. TTL logic families.

Reference Books:

1. M.Morris Mano , Digital Logic and Computer Design.
2. Malvino A.P. and Leach D.P, Digital Principals and Application.
3. Taub H. and Schilling D, Digital Integrated Electronics

IC-304
DATA STRUCTURES AND ALGORITHMS

Course Outcomes:

CO1: The principle objective of this course is to develop proficiency in the specification, representation, and implementation of Data Types and Data Structures.

CO2: Write programs using object-oriented design principles.

CO3: Understand data structures such as linear lists, stacks, queues. Choose the appropriate data structure and algorithm design method for a specified application.,

CO4: Be familiar with advanced data structures such as balanced search trees, hash tables, priority queues and graphs.

CO5: Having good understanding of sorting and searching techniques.

Course Contents:

UNIT I

Introduction to Data Structure: Introduction to C++, Definition of data structures and abstract data types. Static and Dynamic implementations. Examples and real life applications, Data Structures: Arrays, Address calculation in a single and multi dimensional array. Sparse matrices

UNIT II

Stacks, Queues and Lists: Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, postfix, prefix representation Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, postfix, prefix representation

Applications: Mathematical expression Evaluation

Definition: Queues & Lists: Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and Singly linked Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority queues, Applications

UNIT III

Sorting Searching Algorithm, Hashing: Introduction, Sorting by exchange, selection, insertions, Bubble sort, Selection sort, Insertion sort, Pseudo code algorithm and their C++ implementation, Efficiency of above algorithms, Merge sort, Merging of sorted arrays, merge sort algorithms. Quick sort algorithm, Heap sort algorithm, Radix sort

UNIT IV

Straight Sequential Search, Array implementations, Linked List representations, Binary Search, non – recursive Algorithms, recursive Algorithms, Indexed Sequential Search, Hashing, Hash function, Collision Resolution Techniques, Hashing Applications

UNIT V

Trees & Graphs: Definition of trees and Binary trees,Properties of Binary trees and Implementation, Binary Traversal - preorder, post order, in order traversal, Binary Search Trees, Implementations, Threaded trees, Balanced multi way search trees, AVL Trees, and their Applications.

Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, path matrix implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal,

Connectivity of graphs; Connected components of graphs, Weighted Graphs, Applications.

Text Book:

1. A. M. Tenenbaum, Langsam, Moshe J. Augentem, Data Structures using C, PHI Publ.

Reference Books:

1. E. Balagurusamy, Object – Oriented Programming with C++, Tata Mcgraw Hill.
2. A.V. Aho, J.E. Hopcroft and T.D. Ullman, Data Structures and Algorithms, Original edition, Addison-Wesley, 1999, Low Priced Edition.
3. Ellis Horowitz & Sartaj Sahni, Fundamentals of Data structures
4. Robert Kruse, Data Structures and Program Design in C, PHI Pub.
5. Willam J. Collins, Data Structure and the Standard Template library, Tata Mcgraw Hill.

IC-305

DIGITAL COMPUTER ORGANIZATION

Course Outcomes:

CO1: The principle objective of this course is to understand the organization of the computer, and the way the hardware components are connected together to form a computer system, and the development of the hardware for the computer taking into consideration a given set of specifications.

CO2: Understand the various functional units of CPU.

CO3: Study various units of ALU.

CO4: Understand instruction formats and addressing modes.

CO5: Understand interconnection and interfacing of various units of computer system.

Course Contents:

UNIT I

Introduction to computer organization, Von Neumann Architecture, Computer components, interconnection structures, Bus interconnection.

UNIT II

Input output organization: I/O interface models of transfer, interrupt driven I/O, Priority interrupt, DMA, I/O processor and serial communication, Synchronous, Asynchronous data transfer, strobe control, handshaking, PCI, working mechanism of Peripherals: Keyboard, Mouse, Scanners , Video Display, Touch Screen panel etc.(features and principles)

UNIT III

Control Unit: Instruction word format, fetch and execution cycle, sequence of operation of control registers, control of arithmetic operations, microprogramming concepts.

UNIT IV

Memory Organization: Memory hierarchy, internal and external memory. Types of memory: ROM, PROM, EPROM, EEPROM, RAM: SRAM, DRAM

High speed memories: Cache memory, organization and mapping techniques, virtual memory, secondary storage: Magnetic disk, tape, optical memory, CDROM, DVD

UNIT V

CPU Organization: General register organization, stack organization and accumulator type organization. Instruction formats – three address instruction, two addresses, one address and zero address instructions, Instruction set selection. Addressing modes:- Immediate, direct, indirect, register, indexed etc.

Text Books:

1 Computer Organization and Architecture, William Stalling

2 M. Morris Mano , Computer System Architecture, 3rd edition, Prentice Hall of India

Reference Books:

1 Computer Organization by D A Godse and A P Godse

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

M.C.A. (6 Years)

IV SEMESTER

2018 – 2019

Sub. Code	Subject Name	L	T	P	C
IC-401	Data & Computer Communications	3	1	0	**4**
IC-402	Discrete Mathematics	3	1	0	**4**
IC-404	Microprocessor and Assembly Language Programming	3	1	0	**4**
IC-405	Data Base Management Systems	3	1	0	**4**
IC-406	Mini Project	0	0	0	**4**
IC-407	Data Base Management System Lab	0	0	4	**2**
IC-408	Microprocessor and Assembly Language Programming Lab	0	0	4	**2**
	Comprehensive Viva	0	0	0	**4**
					28

IC-401
DATA & COMPUTER COMMUNICATIONS

Course Outcomes:

CO1: The principle objective of this course is to understand the fundamentals of data communications networks.
CO2: Understand basic data communication components.
CO3: Understand the fundamentals of signaling and data transmission.
CO4: Study data link layer and data link protocols.
CO5: Study Network layer, MAC sub layer, LAN and its standards.

Course Contents:

UNIT- I Introduction & Overview of Communication Systems

Data Communication: Components, Data representation, Data flow, Distributed Processing, Network Criteria, Physical structure, Network Models, Categories of Network.
Protocols and Standards: Protocols, Standards, Standards Organizations, Internet Standards. **Guided Transmission Media**: Twisted Pair, Coaxial Pair, Fiber Optics. **Unguided Transmission Media**: Wireless Communication; Cellular Radio; Satellite Communication.

UNIT- II

Network Models: Layered Network Architecture, Peer-to-peer Processes, Layers in OSI Reference Model, TCP/IP model. **Addressing:** Physical, Logical, Port and Specific Addressing, Comparing and Contrasting-OSI & TCP/IP Model.

UNIT- III Physical Layer

Digital Data, Digital Signal: NRZL; NRZI; Bipolar AMI; Pseudo Ternary; Manchester; Differential Manchester; B8ZS; HDB3, Digital Data. **Analog Signal**: ASK; FSK; PSK. **Analog Data, Digital Signal**: PCM; PAM; DM; ADM. **Analog Data, Analog Signal:** AM; FM; PM. **Switching:** Circuit Switch Networks, Datagram Networks, Virtual Circuit Networks. **Multiplexing Techniques:** FDM, WDM, TDM, STDM.

UNIT- IV The Data Link Layer

Data Link Layer Design Issue: Framing; Character Count; Character Stuffing; Bit Stuffing; Physical Layer Coding Violation: Error Control; Flow Control; Error Correcting Codes; Error Detecting Codes; Hamming Codes; CRC Code. **Data Link Protocols**: Stop & Wait Protocol, Unrestricted Stop & Wait Protocol, Simplex Stop & Wait Protocol, Protocol for Noisy Channel, Sliding Window Protocol, Go Back N, Selective Repeat, Verification using File State, HDLC Data Link Protocol, ISDN, ATM.

UNIT-V The Medium Access Protocols

The Medium Access Sub Layer: Channel Allocation; Static; Dynamic, Multiple Access Protocols: ALOHA; CSMA, Collision Free Protocols, Limited Connection Free Protocols, WDMA, Wireless LAN Protocols, Digital Cellular Radio. Overview of IEEE Standards.

Text Books:

1. Data Communications and Networking (IV Edition). B.A. Forouzan (Tata McGraw Hill Publications)

Reference Books:

1. Computer Networks (IV Edition), A.S. Tanenbaum (PHI Publications)
2. Data and Computer Communications, William Stallings (PHI Publications)
3. Data Communications and Networks, Achyut S. Godbole (Tata McGraw Hill Publications)

IC-402
DISCRETE MATHEMATICS

Course Outcomes:

CO1: The principle objective of this course is mathematical concepts that underline much of computer science, and to help them develop the skills to solve problems using them, whether they are in a more advance course, doing research.

CO2: Enhance mathematical reasoning of students.

CO3: Understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.

CO4: Enhance algorithmic thinking of students.

Course Contents:

UNIT I

Set theory: Introduction, sets and elements, universal set and empty set, subsets, Multiset, Countable and uncountable sets, Venn diagrams, Set operations, Algebra of sets, Power sets, Partitions, Inclusion and exclusion, Mathematical induction, Ordered pair, Cartesian product, Computer representation of sets.

UNIT II

Relations: Introduction to relations, Pictorial representation of relations, Domain and range, Types of relations, n-ary relations, Composition of relations, Equivalence relations, Partially ordered relations.

Functions: Introduction to functions, functions in terms of ordered pairs, Pictorial representation of functions, Types of functions: surjective, bijective, injective etc., Composition of relations, Recurrence relations with applications to algorithm analysis

UNIT III

Logic: Propositions and logic operations, Existential and universal quantifiers, Tautologies, Contradiction, Contingency, Logical equivalence.

Boolean algebra: Combinatorial circuits and their properties, Boolean functions and synthesis of circuits.

Lattices: Partially ordered sets, Chains and anti chains, Hasse diagrams, Lattice, Types of lattices, Sublattices, Some special lattices.

UNIT IV

Graph Theory-I: Definition and applications, Finite and infinite graphs, Incidence and degree, Isolated vertex, Pendent vertex, Types of graph, Subgraphs and isomorphic graph, Operations of graph, Paths, Cycles and connectivity, Eulerian and Hamiltonian graph, Planar graphs, Trees, Properties of trees, pendant vertices in a tree, distance and center, rooted and binary trees, spanning trees, fundamental circuits.

UNIT V

Graph theory-II: Cut sets and their properties, connectivity and separability, Network flows, 1 and 2 isomorphism, Matrix representation of graphs: Incidence and adjacency matrices, Diagraphs and shortest path algorithms, Applications of graphs, General discussion.

Reference Books:

1. J.P.Tremblay and R. Manohar . Discrete mathematical structures with applications to computer science, Tata McGraw Hill Publication
2. C.L.Liu . Elements of Discrete Mathematics, Tata McGraw Hill Publication
3. Llipschutz and Lipson. Discrete Mathematics, Schaum's outline series, Tata McGraw Hill Publication
4. K.A.Ross . Discrete Mathematics.
5. Bernard Kolman & Robert C. Busby. Discrete mathematical structures for Computer Science

IC-404
MICROPROCESSOR & ASSEMBLY LANGUAGE PROGRAMMING

Course Outcomes:

CO1: The principle objective of this course is to introduce the basic concepts of microprocessor and assembly language programming.
CO2: Develop an understanding of the operation of microprocessors.
CO3: Learn assembly language programming.
CO4: Learn the internal organization of some popular microprocessors.

Course Contents:

UNIT I
Microprocessor–Based Systems: Hardware and Interfacing, Microprocessors, Microcomputers and Assembly Language8085, Architecture & Memory Interfacing I/O Devices.

UNIT II
Instruction Set and Addressing modes: Data transfer, Arithmetic, Logical, Branch & Machine control instructions, related programs & Addressing modes.
Additional Programming Techniques and Stack Operations: Subroutine, Counters & time delay, Code conversion, BCD arithmetic, 16 bit data operation.

UNIT III
Interrupt & Interfacing some peripheral I/O: Interfacing data converters, Programmable Interface Devices: 8155 I/O and Timer, 8279 Keyboard / Display interface.

UNIT IV
General purpose programmable peripheral devices: 8255 (Bidirectional data transfer between two computer) 8254 (Programmable Interval Timer), 8259A Interrupt Controller,
8237 DMA, Serial I/O Communication.

UNIT V
Other eight bit, sixteen-bit Microprocessor: Z80, MC-6800, MC-68000, NSC
Introduction to advance Microprocessor: 8086, 80286, 80386, Microcontroller 8051.

Text Books:

- R.S. Gaonkar, Microprocessor Architecture Programming and Application of 8085(Latest Edition).

Reference Book:

- Shridhar and Ghosh, 0000 to 8085 Microprocessor.
- Intel Corporation, Microprocessors and peripheral hand book.

IC-405
DATA BASE MANAGEMENT SYSTEMS

Course Outcomes:

CO1: The principle objective of this course is to handle large database system and to be able to manipulate it efficiently and carry out analysis to design the database.
CO2: Present necessary concepts for database designing.
CO3: Design conceptual, logical database model and physical model.
CO4: Evaluate set of query using SQL and algebra.
CO5: Concepts of RDBMS, and learn Object oriented modeling.

Course Contents:

UNIT I

Introduction, Purpose of Database System, View of data, Three Level -Architecture of DBMS, Data independence, Data models - Physical Model, Logical Model, Conceptual Model, Hierarchical data Model, Network data Model, relational data model, Object Oriented Model and their comparison, Database Languages, Transaction Management, Storage Management, Database Administrator, Database Users, Overall System Structure.

UNIT II

Entity-Relationship Model:- Basic Concepts, Design Issues, Mapping Constraint, Keys, Entity-Relationship Diagram, Weak-Entity Sets, Design of an E-R Database Scheme, Reduction of an E-R Schema to Tables.

UNIT III

Introduction to relational database systems, meaning of tuples, attributes, insertion, deletion, updating and retrieval in relational approach, various operations in relational approach like select, project, join, union.

UNIT IV

Structured Query Language:- Table Fundamentals, data types, creating ,viewing table, inserting, deleting, updating and modifying data in table, Applying data constraints-adding primary key, foreign key, unique key in table. Basic Structure, Set Operations, Oracle functions-string function,, numeric function, Aggregation Functions, Null Values, Nested Sub Queries, Joined Relation, Data Definition Language, Data Control Language, Data Transaction Language
Integrity Constraint:- Domain Constraint, Referential Integrity.

UNIT V

Relational Database Design:- Codd's 12 Rules, Pitfalls in Relational-Database Design, Decomposition, Functional Dependencies, Normalization up to 3NF.

UNIT VI

Introduction to VB and connectivity of database with VB.

Text Books:

1 A Silberschatz, H.F Korth, Sudersan "Database System Concepts" , MGH Publication.
2 Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott

Reference Books :

1 Elmasri & Navathe "Fundamentals of Database systems" – III ed.
2 B.C. Desai. "An introduction to Database systems" BPB

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
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MCA (6 Years)

V SEMESTER

2018 – 2019

Sub. Code	Sub. Name	L	T	P	C
IC-501	Internet and Web Programming	3	1	0	4
IC-502	System Programming	3	1	0	4
IC-503	Java Programming	3	1	0	4
IC-504	Computer Oriented Numerical Methods	3	1	0	4
IC-505	Organization Behavior	3	1	0	4
IC-506	Internet and Web Programming Lab	0	0	4	2
IC-507	Java Lab	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

IC-501

INTERNET AND WEB PROGRAMMING

Course Outcomes:

CO1: The principle objective of this course is to provide knowledge of internet tools and to introduce some of the basic technologies for creating and processing content on Internet web sites.

CO2: Understand the fundamental concepts of working of internet.

CO3: Design, format and link web pages.

CO4: Write dynamic interfaces using JavaScript.

CO5: Link databases to web sites.

Course Contents:

UNIT I

Introduction to computer networks: Introduction, Components, Standards, Transmission types, Topologies, Transmission mode.

UNIT II

Internet Basics: Introduction, Internet Service Provider (ISP), Search Engines, Web Browse Architecture, Internet Addressing: IP Address IPv4 and IPv6, e-mail address, Domain address, Uniform Resource Locator (URL), Internet Services: FTP, Telnet, E-mail (SMTP), WWW (HTTP), DNS.

UNIT III

Hypertext Markup Language (HTML*):* Web Terminologies, Web Characteristics, Effective web programming, Web Documents: Static, Dynamic, Active, Browser Architecture, Characteristics of HTML, Types of Tags, Basic Tags, List, Table. Introduction to HTML 5.

Dynamic Hypertext Markup Language (DHTML): Introduction, Cascading Style Sheet (CSS): Introduction, Attributes, Types (Inline style, Style element, External Style Sheet), Class, Introduction to *CSS-3*.

UNIT IV

Java Script: Introduction, Document Object Model (DOM), Variables, functions and events, Data Types and operators, Decision making with control structure and statements, Forms, Cookies, Use of Java Script library *JQuery*.

UNIT V

Introduction to PHP, creating Server-side Applications with PHP, Introduction to Extensible Markup Language (XML*)*.Client side Vs Server side scripting.

Required Text(s) :

1. Data Communication and Networking By Behrouz A. Forouzan (Tata McGraw Hill)
2. Web enabled commercial application By Ivan Bayross (BPB)

Reference Books:

1. HTML By Herbert Schildt
2. Web Programming By Chris Bates.
3. HTML 5 and CSS 3: Develop with Tomorrow's Standard Today(Pragmatic Programmers) By Brian P. Hogan
4. Learning jQuery By Jonathan Chaffer & Karl Swedberg (PACKT Publishing)

Electronic Materials, Web Sites etc:

1. http://www.youtube.com/user/basant1978
2. http://www.w3schools.com/html/
3. http://www.w3schools.com/css/

IC-502
SYSTEM PROGRAMMING

Course Outcomes:

CO1: The principle objective of this course is to enhance the understanding of the concepts of System Programming and to provide a basis for judgment in the design of System Software - Preprocessors, Compilers, Loaders, Debuggers, and Assemblers

CO2: Understand basic concepts of system software and system programming.

CO3: Learn the design of assemblers, compilers and preprocessors.

CO4: Understand the working of loaders, linkers, editors, debuggers and other software tools used in programming development environment.

Course Contents:

UNIT I

Introduction to Software: System Software and Application Software, System Programming, Components of Language Processing System, Fundamentals of Language processing systems.

UNIT II

Assembler: Elements of Assembly Language programming, a simple Assembly Scheme, Pass Structures of Assemblers, Design of a Two-pass Assembler, Algorithms for two pass assembler.

UNIT III

Macros and Macro Processors: Macro definition and call, macro expansions, nested macro calls, Advance Macro facilities, Design of Macro Preprocessor and macro Assembler.

UNIT IV

Compiler: Compiler and Translators, cross compilers, phases in complier Design, Design of Lexical analyzer.

UNIT V

Loaders and Linkers: Loader, General loader scheme, Absolute loading, Relocatable Loading, Dynamic Run Time Loading, Linker, Dynamic Linker, Re-locatable and self-relocating programs.

Software Tools: Software tools for program development, Editors, Debugger, Debug Monitors, Programming Environments, User Interfaces, Co-routines and reentrant programs.

Text Books:

1. D. M. Dhamdhere, System Programming and Operating System, 5th edition
2. John. J. Donovan, System Programming, Tata McGraw Hill.

Reference Books:

1 Aho and Ullman , Principles of Compiler Design, Pearson Education.

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

3. Dougles. V. Hall , "Microprocessors and Interfacing", Tata McGraw Hill.

IC-503
JAVA PROGRAMMING

Course Outcomes:

CO1: The principle objective of this course focuses on Java programming language fundamentals: its syntax, idioms, patterns, and styles with object oriented programming concepts.

CO2: Write programs using the Java language. Basic topics considered are programs and program structure in general, and Java syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, recursion, and graphical user interfaces (GUIs).

Course Contents:

UNIT I

Introduction to Java: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, decision making operators, Naming Conventions Introduction to Class, Objects, Methods and Instance Variables, Primitive type Vs Reference Type, Initializing Objects with Constructors. Type conversion & casting, Operators, Control statement, while, do-while,for, foreach Statements, switch Multiple-Selection Statement, break and continue Statements. Static Method, static field and Math Class, Argument Promotion and Casting, Scope of declaration and Method Overloading.

String Handling & Arrays: String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer.

Arrays: Declaring and Creating Arrays, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments. Final Instance Variables, this reference, static import, overloaded Constructors, Garbage collection and method finalize, Overloading methods, Parameter passing.

UNIT II

Inheritance & Polymorphism: Inheritance: Extending classes, protected Members, relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses

Polymorphism: Method overriding, upcasting, Dynamic Method Dispatch, final Method and classes, Abstract classes and Methods, instanceof operator, Downcasting

Packages and Interfaces: Packages: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages.

Interfaces: Defining an Interface, Properties of interface, advantages of interface, Achieving multiple inheritance through interfaces, Variables in Interfaces.

UNIT III

Nested Classes & Exception Handling: Nested Classes: Overview of nested class and interfaces, static nested class and interfaces, non-static nested class and, anonymous classes.

Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Java Exception Hierarchy, finally block, chained exceptions, declaring new exception types .

Streams and Files: Introduction to Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream class Hierarchy.

UNIT IV

Multithreading: What are threads, The java thread model, Thread priorities, Thread life cycle, Creating thread and executing thread, Thread Synchronization, producer-consumer problem without Synchronization. Producer-consumer problem with Synchronization, Other class and Interfaces in java.util.concurrent, Monitor and Monitor Locks, Thread Groups, Synchronization, Inter-thread Communication.

Introduction to GUI & Applets: Introduction To GUI : Introduction, Overview of swing Components, Displaying text and Images in a window, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, How Event Handling Works, Adapter Classes, Layout Managers

Applets: Applet basics, Applet Architecture, Applet life cycle methods, Applet HTML Tag and attributes, Executing applet in web browser and in the appletviewer, in Passing parameters to Applets, doing GUI programming in applet.

UNIT V

Generic & Collection: API Generic: Introduction, Motivation for Generic Methods, Generic Methods : Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance

Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC, The Structured Query language, Basic JDBC Programming concepts, Executing Queries.

Text Books:

1. Deitel & Deitel, JAVA How to Program, Pearson Education, Sixth Edition
2. Herbert Schildt , Java : The Complete Reference, Tata McGraw- Hill, 7th Edition

Reference Books:

1. John Hubbard , Programming with Java (Schaum's Easy Outline)
2. JAVA 2 Black Book
3. Bruce Eckel , Thinking in Java, Prentice Hall
4. Gary Cornell, Cay Horstmann Core Java: Volume 1 Fundamentals, Eighth Edition, Pearson,
5. Sams Teach Yourself Java6 in 21 Days

IC-504
COMPUTER ORIENTED NUMERICAL METHODS

Course Outcomes:

CO1: The principle objective of this course is to understand basic numerical methods required for typical engineering and business applications.

CO2: Understanding the properties of different numerical methods so as to be able to choose appropriate methods and interpret the results for engineering problems that they might encounter.

CO3: Find numerical approximations to the roots of an equation by Newton method, Bisection Method, Secant Method, etc.

CO4: Use finite differences for interpolation and learn various interpolation methods.

CO5: Understand numerical integration and differentiation.

Course Contents:

UNIT I

Introduction to Software: System Software and Application Software, System Programming, Components of Language Processing System, Fundamentals of Language processing systems.

UNIT II

Assembler: Elements of Assembly Language programming, a simple Assembly Scheme, Pass Structures of Assemblers, Design of a Two-pass Assembler, Algorithms for two pass assembler.

UNIT III

Macros and Macro Processors: Macro definition and call, macro expansions, nested macro calls, Advance Macro facilities, Design of Macro Preprocessor and macro Assembler.

UNIT IV

Compiler: Compiler and Translators, cross compilers, phases in complier Design, Design of Lexical analyzer.

UNIT V

Loaders and Linkers: Loader, General loader scheme, Absolute loading, Relocatable Loading, Dynamic Run Time Loading, Linker, Dynamic Linker, Re-locatable and self-relocating programs.

Software Tools: Software tools for program development, Editors, Debugger, Debug Monitors, Programming Environments, User Interfaces, Co-routines and reentrant programs.

Text Books:

4. D. M. Dhamdhere, System Programming and Operating System, 5th edition
5. John. J. Donovan, System Programming, Tata McGraw Hill.

Reference Books:

1 Aho and Ullman , Principles of Compiler Design, Pearson Education.

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

6. Dougles. V. Hall , "Microprocessors and Interfacing", Tata McGraw Hill.

IC-505
ORGANIZATION BEHAVIOR

Course Outcomes:

CO1: An organization is a living organism whose basic component is the individual.

CO2: The students are required to gain the intricacies of individual behavior in order to function effectively and efficiently in the organization.

CO3: Potential sources of conflicts which will make their careers interesting and enjoyable.

Course Contents:

Unit 1 Foundation of Individual Behavior : Concept, definition and importance of Organizational behavior. Application of Organizational behavior in personal and professional life.

Unit 2 learning concept, definition and learning theories,perception and its process. Personality concept definition and Determinant and Attributes.

Unit 3 Motivation : meaning, concept and definition.Needs., Maslows hierarchy of needs, Herzbergs two factors theory. ERG theory.

Unit 4 Foundation of Group Behavior: Defining and Classifying groups, group structure and process, Group Behaviors process of group formation, Group decision making.

Unit 5 Leadership : Meaning, definition and Trait theories, behavioral theories- ohio state studies, Michigan Studies And managerial grids; contingency theories, situational theories.

Unit 6 Stress Management: Stress Management potential sources, consequences and coping strategies for stress .

Unit 7 Managing Change: Organizational Change: Meaning, definition & Types of organizational change. How to overcome the Resistance to Change, Kurt Lewins- Three step model.

Reference books:

Human Resource Management : Gary Dessler,Pearson Education
Managing Human Resources : David B Balkin, Pearson Education
Organization Behavior by stephen robbins PHI
Organization behavior by Fred Luthans, PHI

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MCA (6 Years)

VI SEMESTER

2018 – 2019

Sub. Code	Sub. Name	L	T	P	C
IC-601	Computer Graphics	3	1	0	4
IC-602	Human Computer Interface	3	1	0	4
IC-603	UNIX Operating System	3	1	0	4
IC-604	System Analysis & Design	3	1	0	4
IC-605	Project	3	1	0	4
IC-606	Unix And Shell Programming Lab	0	0	4	2
IC-607	Computer Graphics Lab	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

IC-601
COMPUTER GRAPHICS

Course Outcomes:

CO1: The goal of this course is to provide an introduction to the theory and practice of computer Graphics.
CO2: Understanding the basic concepts of Graphics.
CO3: Study of different algorithm of graphics.
CO4: Implementation of rotation, clipping, transformation algorithm etc.

Course Contents:

Unit -I

Introduction and need of computer graphics: Definition of Computer Graphics, Broad Areas of Computer Graphics (Generative Graphics, Cognitive Graphics, Image Processing), Application of Computer Graphics.

Block diagram of computer graphics systems: Necessary hardware requirements for Computer Graphics systems. **Graphics display devices:** CRT, Color CRT, Direct View Storage Comparison between them.**Flat panel devices:** Plasma, LCD, LED, Comparison between these technologies.

Basic concepts and terminologies of computer graphics: Pixel, Frame Buffer, Refresh rate, Persistence, Aspect Ratio, Numerical problems.**Block diagram of raster scan and random scan system:** Vectored Graphics, Graphics Card, Video Controller, Graphics Processing Units GPUs. CPU v/s GPU.**Input devices:** Scanners, Handheld, BarCode Reader(s), Mouse, Keyboard.**Output devices:** Hard Copy devices: Printer, Plotter(s). Bio metric input/output devices.

Unit -II

Output primitives: Development and implementation of algorithms for basic graphics output. Point plotting, Line drawing (using Cartesian equations, Parametric equations, Digital Differential Analyzer DDA, Bresenham's algorithm with all cases), Circle and ellipse drawing algorithms, Numerical problems.

Polygon(s)representation: Definition ,types (Convex and Concave), Inside Outside Test with (4 and 8 Connected Points) ,Filling of Polygon , Circle and ellipse.

Unit -III

2DTransformation: Mathematical Background of Transformation, Homogeneous co ordinates Derivations of Transformations (Translation, Reflection, Rotation, Scaling, Shearing, Reflection about arbitrary line $y = m x + c$), Related numerical problems and Programs.

3DTransformation: Mathematical Background of Transformation, Derivations of Transformations (Translation, Reflection, Rotation, Scaling, Shearing, Reflection, Projections), related numerical problems and Programs.

Segmentation: (Refer chapter5, from book *Computer Graphics by Steven Harrington*) Display files, segment table, creating, closing, renaming, and deletion of segments.

Unit-IV

Introduction to windowing: Definitions of world coordinate system, normalized device coordinates, viewport coordinate systems, 2Dviewing transformation, Window to viewport transformation.

Introduction to clipping: (Point, line, Polygon, Curve, Text clipping), Algorithm for point and line clipping ,Cohen Sutherland line clipping, Parametric LiangBarsky line clipping algorithm, Polygon clipping, Sutherland Hodgeman Algorithm.

Unit-V

Introduction to design of curves: Parametric equations of curve, interpolation and approximation approach for curve representation, Piecewise curves, Splines, Cubic Splines, zeroorder, Firstorder,second order,parametric and geometric Continuity, Bezier curves, Bezier surfaces, BSpline curves and their properties.

Hidden Surface and Back face Detection: Depth Buffer algorithm, Painters algorithm.

Books:

1. Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).
2. Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addisen Wesley (Indian Edition).
3. Computer Graphics by Atul P. Godse and Deepali A. Godse, Technical Publications
4. Computer Graphics by Steven Harrington published by McGrawHill
5.Computer Graphics by Zhigang Xiang and Roy Plastock, Schaum's outline, Second Edition

IC-602

HUMAN COMPUTER INTERFACE

Course Outcomes:

CO1: Explain the capabilities of both humans and computers from the viewpoint of human information processing.

CO2: Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.

CO3: Apply an interactive design process and universal design principles to designing HCI systems.

CO4: Describe and use HCI design principles, standards and guidelines.

CO5: Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.

CO6: Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.

CO7: Analyze and discuss HCI issues in groupware, ubiquitous computing, virtual reality, multimedia, and Word Wide Web-related environments.

Course Contents:

UNIT - I Introduction- Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT - II The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - III Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT - IV Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - V Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - VII

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers. Case Study 1- Multi-Key press Hindi Text Input Method on a Mobile Phone. Case Study 2 - GUI design for a mobile phone based Matrimonial application. Case Study 3 - Employment Information System for unorganised construction workers on a Mobile Phone.

TEXT BOOKS : 1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech. 2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES : 1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON. 2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech, 3. User Interface Design, Soren Lauesen , Pearson Education.

IC-603

UNIX AND SHELL PROGRAMMING LAB

Course Outcomes:

CO1: The principle objective of this course is to understanding of basic concepts of operating system with special reference to UNIX operating system.
CO2: Understand UNIX as operating system.
CO3: Learn to use UNIX shell.
CO4: Learn to use UNIX commands.
CO5: Send and receive electronic mail and learn its real-world limitations
CO6: Learn File handling and shell programming.

Course Contents:

UNIT I

Introduction and familiarization: History of UNIX operating system, Architecture of Unix login and log out

UNIT II

UNIX file system: File system hierarchy: file name, attributes, access rights and their change, copying moving and removal of files.

File permission mask, /etc/passwd file, su, newgrp, chown, chgrp commands. Contents of file and file commands. Hard and Soft links, search in file system find command.

UNIT III

Filters, standard input and standard output, pipes, pipelines, simple text manipulation utilities, utilities for comparing text files. Regular expression grep, egrep, fgrep, programmable filters sed, awk. Back up of files and directories, tar, cpio, dd.

UNIT IV

UNIX shell: Basic UNIX user skill, shell as command language, interpreter, command line, shell file metacharacter, script writing, examples of script. Process, ps, shell as process, job control, signals. Vi editor

UNIT V

Shell programming concept. Shell script control statements, loops, branching, return codes, test statements, shell parameters.

Text Books:

1. Sumitabha Das, UNIX: Concepts and application.

Reference Books:

1. Maurice J. Bach, The design of the UNIX operating system.
2. Y. Kanetkar, UNIX shell programming
3. Kamran Hussain, Linux Unleashed, Tim Parker.
4. Christopher Vickery, UNIX shell programmer's Interactive Workbook.
5. Mark F. Komarinsk, Cary Colette, Linux system administration handbook.
6. Dent and Gaddis, Guide to using Linux

IC-604
SYSTEM ANALYSIS & DESIGN

Course Outcomes:

CO1: The principle objective of this course is to introduce established and evolving methodologies for the analysis, design, and development of an information system.

CO2: Understand system characteristics, project management, prototyping, and systems development life cycle phases.

CO3: Analyze a problem and design an appropriate solution using a combination of tools and techniques.

Course Contents:

UNIT- I

Overview of system analysis and design: Systems concepts, Definition, Characteristics of a system, Elements of a system, Types of System Physical or Abstract System, Open or Closed Systems, Man-Made Information Systems: Categories of Information, Formal Information Systems, Informal Information Systems.

UNIT- II

System Development Life Cycle: Recognition of need, feasibility study, Analysis, Design, Implementation, Post implementation and Maintenance, Project Termination, Prototyping.
Role of the system Analyst: Definition, Skills, Academic and Personal Qualifications, The Multifaceted Role of Analyst.

UNIT- III

System Analysis:
System Planning and the Initial Investigation: Bases of Planning in System Analysis, Dimensions of Planning, Initial Investigation, Needs Identification, Strategies for Determining Information Requirements, Problem Definition and Project Initiation, Background Analysis: Fact-Finding, Fact Analysis, Determination of Feasibility.
Structured Analysis: Introduction, Tools of Structured Analysis: Dataflow Diagrams, Data Dictionaries, Decision Tables, Decision Trees, Structured English.
Feasibility study: Introduction, Feasibility Considerations, Feasibility Study Stages, Feasibility Report, Cost/Benefit Analysis.

UNIT- IV

System design:
The Process and Stages of System Design: Introduction, The Process of Design: Logical and Physical Design, Design Methodologies: Structured Design, Form-Driven Methodology – The IPO Charts.
Input /Output and Form Design: Introduction, Input Design, Output Design, Form Design.
File Organization and Data Base Design: Introduction, File Structure, File Organization, Data Base Design, Views of Data, Data Structure.

UNIT- V

System Implementation, Post Implementation and Maintenance: Introduction, Testing objectives, System Testing, Types of System Tests, Quality Assurance: Quality Factors Specifications, Levels of Quality Assurance, Post Implementation and Maintenance, Project Scheduling, Project management.

Text Books:

1. System Analysis and Design by Elias M. Awad (GALGOTIA Publications)

Reference Books:

2. Analysis and Design of Information Systems by V. Rajaraman (PHI Publications)
3 System Analysis and Design & MIS by Anurag Jain (EXCEL BOOKS Publications)

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

VII SEMESTER

2018 – 2019

Sub. Code	Subject Name	Credit
IC-701	Design & Analysis of Algorithms	4
IC-702	Computer Architecture	4
IC-703	Advanced Java	4
IC-704	Operating Systems	4
IC-705	Analog Electronics	4
IC-706	Advanced Java Lab	2
IC-707	Design & Analysis of Algorithms Lab	2
	Comprehensive Viva	4
		28

IC-701
DESIGN & ANALYSIS OF ALGORITHMS

Course Outcomes:

CO1: The principle objective of this course is to introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.

CO2: Learn to analyze the running time of the algorithms

CO3: Understand the application of algorithms and design techniques to solve problems.

CO4: Learn to analyze the complexities of various problems in different domains and design efficient algorithms.

CO5: Understand asymptotic notation to provide a rough classification of algorithms

CO6: Study algorithms for fundamental problems in computer science and engineering work and compare with one another.

CO7: Understand the problems for which it is unknown whether there exist efficient algorithms or even algorithm.

Course Contents:

Units 1.

Introduction to Algorithms, What is an Algorithm, Algorithm Specification, Performance analysis., Review of Data Structures, Stacks and Queues, Trees ,Graphs

Units 2.

Divide and Conquer, Genaeral Method, Binary Search, Finding the Maximum and Minimum , Merge Sort , Strassen's Matrix Multiplication ,

Units 3.

The Greedy Method , General Method , Knapsack Problem , Job Sequencing with deadlines , Minimum Cost Spanning Trees , Prim's Algorithm, Kruskal's Algorithm

Units 4.

Dynamic Programming, The General Method, Multistage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, 0/1 Knapsack, Traveling Salesperson Problem

Units 5.

Basic Traversal and Search Techniques, Techniques for Binary Trees, Techniques for Graphs , Back Tracking, The Genaral Method , The 8-Queens Problem , Sum of Sub sets , NP-Hard and NP-Complete Problems, The Basic Concepts , Non-Deterministic Algorithms , The Classes NP-Hard & NP-Complete.

RECOMMENDED BOOKS

[1] T.H. Coreman, C.E. Leiserson and R.L. Rivest, Introduction to Algorithms, Prentice Hall of India, 1990.

[2] E. Horowitz, S. Sahni, S Rajasekaran, Computer Algorithms, Galgotia Publications.

[3] Saara Base, Computer Algorithms: Introduction to Design and Analysis, Addision Wesley, 2/e, 1988.

[4] Knuth, D, The art of computer programming, Vols. 1-2-3, Addision Wesley 1968-73.

[5] A V Aho, J E Hopcroft & J D Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley, 1974.

IC-702
COMPUTER ARCHITECTURE

Course Outcomes:

CO1: The principle objective of this course is to understand the concepts of design and analysis of the hardware of a computer system and its components such as control unit, arithmetic and logical (ALU) unit, input/output, and memory unit.

CO2: Learn concepts of microprogramming in the design of the central processing unit of a computer system.

CO3: Understand various ways for interconnecting I/O devices to the system.

CO4: Understand basic concepts of parallel processing.

Course Contents:

UNIT I

Introduction and vocabulary, History of computer architecture, Overview of computer organization, Difference between Computer architecture & organization, von Neumann/Turing, IBM 360 series, Moore's law, Performance measurement: IPC, CPI, MIPS, Amdahl's law, CPU performance equation, Speeding it up, Performance Mismatch & Solutions, Instruction cycle, Interrupt cycle, Bus interconnections: Types, Arbitration, PCI.

UNIT II

CPU Structure, Registers, User Visible Registers, General Purpose Registers, accumulator organization, general register organization, stack organization of CPU, High level issues in CPU design, Memory: Location, Capacity, Unit of transfer, Access method, Performance (Access, cycle, transfer rate), Physical type (semi conductor or magnetic), Physical characteristics (volatile, erasable etc.), Locality of references, Cache mapping techniques, Cache write policies, Cache initialization, External memory, RAID organization of hard disks.

UNIT III

Input/Output: Programmed I/O, Interrupt Driven I/O, Direct Memory Access. Representing information digitally, Byte Ordering: Big-Endian & Little-Endian. Instruction sets, Elements of an Instruction, Instruction Representation, Instruction types, Number of Addresses, Design Decisions [CISC/RISC], Addressing Modes, Large Register File in RISC.

Register and data flow design, data fetch and instruction fetch in indirect instruction cycle, CPU control unit, Functions of Control Unit, Micro-Operations, Micro Programmed Control and Hardwired control unit and their advantages-disadvantages.

UNIT IV

Instruction level parallelism: Pipeline design, Synchronous & Asynchronous Pipeline conflicts: Resource conflict, Data dependency, and Branch difficulties. Solutions to deal with pipelining: Hardware interlocks, operand forwarding, Delayed load, Pre fetch target instruction, Branch target buffer, Loop buffer, Branch prediction, and Delayed branch. Super scalar design; Super pipelining, and VLIW processors.

UNIT V

Parallel Processing, Flynn's classification: SISD, SIMD, MISD, MIMD. Vector processor, Array Processor, Symmetric multi processing, NUMA, Cache coherence in parallel computing.

Reference Books:

1. William Stallings, Computer Organization and Architecture: Design for performance

8th Ed., Pearson Education.
2. Rajkamal, Computer Architecture, ISP 2006, Tata McGraw HILL.
3. Andrew Tanenbaum, Structured computer organization, 4th Ed., Prentice – Hall, Upper Saddle River, NJ, 2000. (Alternate reference)
4. M. Morris Mano, Computer System Architecture, 3rd Ed., Pearson Education.
5. Kai Hwang, Computer Architecture

IC-703
ADVANCED JAVA

Course Outcomes:

CO1: The principle objective of this course is to introduce the enhanced and advanced concepts of Java.
CO2: Design and developing an understanding of the web applications of Java.
CO3: Learn Java programming language with new and enhanced versions.
CO4: Students will capable of making their own GUI, network, security, thread, Servlet and JSP based systems.
CO5: These learning will helpful for their campus based recruitment as well as in the organization.

Course Contents:

UNIT I

Collections: Collection Interfaces, Concrete Collections, the Collections Framework
Multithreading: Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of thread.

UNIT II

Networking: Internet Addressing,InetAddress, Factory Methods, Instance Method,TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams
Java Database Connectivity (JDBC): Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures C

UNIT III

Servlets: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession.

UNIT IV

Java Server Pages (JSP): Introduction, Java Server Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

UNIT V

Remote Method Invocation: Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client
Common Object Request Broker Architecture (CORBA): Technical/Architectural Overview, CORBA Basics, CORBA services
Introduction SmartPhone Application Development: Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API.

Text Books:

- Core JAVA Volume-II- Advanced Features, 9th edition , Horstmann Cornell- Pearson.
- "Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice
- "Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional" by Antonio Goncalves
- Head First Servlets and JSP, Bryan Basham, O'Reilly

Reference Book/Web:

- Deitel & Deitel, JAVA How to Program, Pearson Education, Sixth Edition
- Herbert Schildt , Java : The Complete Reference, Tata McGraw- Hill, 7th Edition
- http://www.w3schools.in/java/
- http://www.tutorialspoint.com/

IC-704
OPERATING SYSTEMS

Course Outcomes:

CO1: The principle objective of this course is to make the students familiar with design of operating systems as resource manager of a computer system.
CO2: Present basic concepts of operating system architecture
CO3: Understand the concepts of processor management and memory management techniques
CO4: Study deadlock handling and inter-process communication
CO5: Study of file systems and device management.

Course Contents:

UNIT I

Introduction to Operating System:- Objectives and functions and the services provided by OS.
Evolution of operating system:- Concepts of batch processing, multiprogrammed batched system, time-sharing systems, Parallel Systems, Distributed systems. Operating system structure: -System calls and system programs.

UNIT II

Process Management: -Process concept, Process states, Process scheduling , Operations on processes , Co-operating processes and IPC.
CPU scheduling: - Basic concept and scheduling criteria, Long term, short term medium term schedulers, Scheduling algorithms, Multi-Processors Scheduling, Measurement of performance of processor.

UNIT III

Process synchronization: - Critical section problem, Mutual exclusion and synchronization, Concept of semaphores, Classical IPC problems. Deadlocks: - Characterization of deadlock, Methods of handling prevention, detection and avoidance, Recovery from deadlock.

UNIT IV

Memory management:-Logical and physical address spaces, Swapping and paging, Contiguous, allocation and its drawbacks, Non-contiguous allocation. Virtual memory: - Demand paging and its need, Performance of demand paging, Page replacement and its need, Thrashing and allocation of frames.
File system interface: - File concept, access methods, Directory structure, protection and consistency. File system structure, Allocation methods, Free space management, Efficiency and performance, Coincidence, protection and sharing.

UNIT V

I/O system: - Various i/o devices, Device drivers, structure of I/O software, Transforming
I/O request of h/w operation. Secondary storage structure:- Disk structure, Disk Scheduling, Disk management, Swap space management and Disk reliability.
Note:- Case study of windows and Unix operating system is to be done as assignment.

Text Book:

1. Silberschatz , Gagne, Galvin, Operating System concept, 8th edition, WILEY.

Reference Books:

1. D. M. Dhamdhare, System Programming and operating system, Tata McGraw Hill, 3rd edition.

2. Gary Nutt, Operating Systems, 3rd edition Pearson Education.
3. Andrew S. Tanenbaum, 3rd edition Modern Operating Systems
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IC-705
ANALOG ELECTRONICS

Course Outcomes:

CO1: The principle objective of this course is to enable students understand operational amplifiers.

CO2: Understand working of amplifiers.

CO3: Understand amplifier circuits, feedback circuits, and oscillator circuits To teach basic numerical methods required for typical engineering and business applications.

Course Contents:

UNIT I

Amplifier Circuits: Overview of BJT DC biasing techniques: Fixed bias, emitter stabilized bias, voltage divider bias.BJT Small signal analysis: Common emitter fixed bias, voltage divider bias, emitter follower.

UNIT II

Frequency Effects: Frequency response of an amplifier: Input & Output coupling capacitor, emitter and collector bypass capacitor, Miller's theorem, decibel voltage gain, cascading of stages.

UNIT III

Operational Amplifier: Differential and common mode operation, Non-inverting and inverting amplifiers: summing amplifier, integrator, and differentiator. Op-Amp specifications: DC offset parameters, frequency parameters.

UNIT IV

Feedback circuits: Concept of feedback, Feedback connection types, effect of feedback on gain and bandwidth.

UNIT V

Oscillators circuits: Operation, Phase Shift, Wein Bridge, Tunned and Crystal oscillators

Text Book:

1. Adel S. Sedra, Kenneth C. Smith, Microelectronics Circuits Theory and Applications

Reference Books:

4. Electronic Devices and Circuit theory by Robert Boylestad & Louis Nashelsky.
5. Electronic Principles by A. P Malvino.

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MCA (6 Years)

VIII SEMESTER

2018 – 2019

Code	Subject	L	T	P	C
IC-801	Computer Networks	3	1	0	4
IC-802	Theory of Computation	3	1	0	4
IC-803	Advance Database Management Systems	3	1	0	4
IC-804	Software Engineering	3	1	0	4
IC-805	Optimization Techniques	3	1	0	4
IC-806	Computer Network Lab	0	0	4	2
IC-807	Advance Database Lab	0	0	4	2
	Comprehensive Viva				4
					28

IC-801
COMPUTER NETWORKS

Course Outcomes:

CO1: The principle objective of this course is to provide a theoretical foundation of computer network and equip the students with an in-depth knowledge of fundamental techniques involved in computer network, which helps the students to understand the actual working of computer network.

CO2: Gain an understanding of the principles of operation of a wide variety of network technologies.

CO3: Develop an appreciation of how network services are developed and knowledge of their uses.

CO4: Apply knowledge of computers, software, networking technologies, and information assurance to an organization's management, operations, and requirements.

Course Contents:

UNIT I

Introduction: - Computer Network, Goals and Applications, Reference models – OSI and TCP/IP. A Comparative study. Network hardware – LAN, MAN and WAN and topologies, Network Software –protocol hierarchies, design issues for the layers, Connection Oriented and connection less services, Switching Techniques – Circuit Switching, Message switching, Packet Switching.

UNIT II

Data Link Layer :- Design Issues : Framing, Error Control, Flow Control, , Elementary Data Link Protocols, Sliding window protocol, Example Data link protocols :HDLC, SLIP and PPP.

UNIT III

MAC Sub layer :- Multiple access protocols: Aloha, CSMA Protocols, Collision-Free Protocols, Binary Exponential Back-off algorithm ,Ethernet MAC Sub layer Protocols: IEEE802.3, IEEE802.4, IEEE802.5 , High speed LANs – Fast Ethernet, FDDI, Wireless LANs, Bridges.

UNIT IV

Network Layer :- Design issues, Routing Algorithms: OptimalityPrinciple, Shortest Path Routing, Flooding, Distance Vector Routing, LinkState Routing , Hierarchical Routing, Broadcasting Routing, MulticastRouting,Congestion control algorithms,Internetworking, The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols.

UNIT V

Transport Layer :- Services, The Internet Transport Protocols : TCP and UDP,performance issues

Application layer :- DNS Name Space, Name Servers, FTP, TELNET,WWW, SNMP, HTTP, SMTP , Network Security : Cryptography,Symmetric- key Algorithms, Public- key Algorithms, Digital Signatures,E-mail Security

Reference Books:

1. A.S. Tanebaum, Computer Network (III Edition).
2. B.A. Forouzen, Data Communication and Networking (II Edition).
3. William Stalling, Data and Computer Communication.

IC-802
THEORY OF COMPUTATION

Course Outcomes:

CO1: The principle objective of this course is to make students know about the basic concepts of Computation and learn to work with mathematical abstractions of computers called a model of computation.

CO2: Understand regular expressions, which are used to specify string patterns in many contexts, from office productivity software to programming languages.

CO3: Study finite automata, another formalism mathematically equivalent to regular expressions, Finite automata are used in circuit design and in some kinds of problem- solving.

CO4: Learn Context-free grammars that used to specify programming language syntax.

CO5: Understand computability theory and decision problems.

Course Contents:

UNIT I

Formal languages: Introduction to Computation & Languages: Natural Languages, Computer Programming Langauges and Formal Languages. Language Concepts: alphabet, strings, properties of Strings, kleene closure. Properties of Formal Languages.

Grammar: Chomsky Hierarchy of grammar, languages represented by type 0,1,2,3 grammars.

UNIT II

Regular languages and finite automata-recursive definition, regular expression and corresponding languages, Pumping Lemma for non-regular languages. Finite automata, kleene's theorem, non-deterministic finite automata. Equivalence of FAs and NFAs. Minimal state finite automata, Mealy machine and Moore machine, Regular grammar and their equivalence to finite automata.

UNIT III

Context free languages Parsing, ambiguity, parse trees, parsing methods: Bottom up and top down, Simplification of grammar. Normal form of CFGs: Chomsky Normal Form and Greibach Normal Form, CKY algorithm, Closure Properties of CFLs

UNIT IV

Push Down Automata: definition, examples, deterministic PDA, non-deterministic PDA, Parsing and PDAs, PDA and Context Free Languages

UNIT V

Turing machines – models of computations, definition, Representation of Turing Machines, TMs as language acceptors, Techniques for TM construction, Church - Turing thesis, Universal Turing machines, Variants of Turing machine.

Unsolvable Decision Problems- Decidability, Decidable Languages, Undecidable Languages Halting Problem of Turing Machine.

Reference Books:

4. Hopcraft and Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House.
5. K.L.P. Mishra, N. Chandrasekaran, Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India.
6. Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publishing House.
7. Cohen Daniel I.A., Introdution to Computer Theory, John Weley and Sons , inc

New York
8. Martyn John C, Introduction to Languages and Theory of Computation, McGraw Hill, N.Y. (Internal Edition McGraw Hill)
9. Mandrioli Dino, Ghezzio Carlo, Theoretical Fundamentals of Computer Science, John Weley and Sons, Inc , New York.

IC-803

ADVANCED DATABASE MANAGEMENT SYSTEM

Course Outcomes:

CO1: The principle objective of this course is to learn advanced features of DBMS and build capacity to implement and maintain an efficient database system using emerging trends.

CO2: Understand the master the concepts and design with proficiency databases under the relational model.

CO3: Proficiency in the choice of DBMS platform to use for specific requirements

CO4: Developed proficient with a broad range of data management issues including data integrity and security, transaction processing and others.

CO5: Familiar with the fundamentals of distributed DBMS and object database management, data warehousing and data mining.

Course Contents:

UNIT I

Introduction with DBMS and ER Model : Advantage of DBMS approach, various view of data, data independence, schema and sub-schema, primary concepts of data models, Database languages, transaction management, Storage management Database administrator and users, overall system architecture.

Basic concepts of ER model, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema.

UNIT II

Functional Dependencies and Normalization: Domains, relations, keys, super key, candidate, primary, alternate and foreign keys, Functional dependence, Full Functional dependence, trivial dependencies, transitive dependencies, Mutual independence, closure set of dependencies, non loss decomposition, FD diagram. Introduction to normalization, first, second, third Normal forms, dependency preservation, BCNF, Multivalued dependencies and fourth normal form.

UNIT III

PL/SQL fundamentals: Variables, reserve words, identifiers, anchored data types, blocks, labels, use of DML in PL/SQL, commits, rollback, savepoint, conditional control: if, case, nullif, coalesce, iterative processing with loops: Loop basics , simple loops, while, for loop.

UNIT IV

Database Integrity, Transaction, concurrency and Recovery: Basic idea of Database Integrity, Integrity rules, assertions, integrity Constraints, triggers.

Basic concepts of Transaction, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, Serializability, Conflict serializability, View serializability, basic idea of concurrency control, Concept of locking, types of locks, basic idea of deadlock, deadlock handling.

UNIT V

Distributed Database and Emerging Fields in DBMS: Basic idea of Distributed database, distributed data storage, data replication, data fragmentation- horizontal vertical and mixed fragmentation.

Object oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity.

Data warehousing- terminology, definitions, characteristics, data mining and it's overview, Database on www, multimedia Databases- introduction, similarity based retrieval, continuous

media data, multimedia data formats, video servers.

Reference Books:

1. A Silberschatz, H.F Korth, Sudersan "Database System Concepts" , MGH Publication.
2. Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott
3. Elmasri & Navathe "Fundamentals of Database systems" – III ed.
4. B.C. Desai. "An introduction to Database systems" BPB.

IC-804
SOFTWARE ENGINEERING

Course Outcomes:

CO1: The principle objective of this course is to understanding in the discipline of software engineering and its application for the development of and management of software systems.
CO2: Understand the various activities undertaken for a software development project.
CO3: Develop and write a software project proposal
CO4: Develop and write a Software Requirements Specification and design document.
CO5: Learn to work within a team and understand team dynamics
CO6: Be able to effectively communicate the work (Presentation skills)

Course Contents:

UNIT I

Introduction to Software Engineering: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications.

Software Processes: Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, RAD model, Iterative Enhancement model, Spiral model, Component based development, Comparative study of various development models

UNIT II

Project management process: The people, product, process and project, Phases of project management process, the W5HH principle. Software configuration management process, Process management process: Capability Maturity Model (CMM).

UNIT III

Software Requirement Analysis and Specification: Software requirements, Problem analysis, Requirements specifications, Validation and Verification, Metrics.

Project Planning: Project estimation (Size & Cost), Project Scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans, Risk management.

UNIT IV

Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion, Coupling. Structured design methodology.

UNIT V

Software Quality Assurance: Quality concept, Quality management system, movements and assurance, Software reviews: formal and technical, Formal approaches to SQA, Statistical software quality assurance, Software reliability, ISO 9000, SQA plan.

Software Testing: Software testing techniques: Testing fundamentals, White box testing, Black box testing, testing for specialized environments, architectures and applications. Software testing strategies: A strategic approach to software testing, Strategic issues, Unit testing, Integration testing, Validation testing and system testing, the art of debugging

Reference Books:

1. Dr. Ugrasen Suman, Software Engineering: Concepts and Practices, Published by Cengage Learning.
2. Ian Sommerville, Software engineering, Ninth edition Pearson
3. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing

House.
4. R. S. Pressman, Software Engineering-A practitioner's approach, Tata McGraw-Hill International Editions, New York.
5. Richard E. Fairly, Software Engineering Concepts, Tata McGraw Hill Inc. New York.
6. W. S. Jawadekar, Software Engineering: Principle & Practice, Tata McGraw-Hill, New York

IC-805
OPTIMIZATION TECHNIQUES

Course Outcomes:

CO1: The principle objective of this course is to make the students aware of organizational behavior of management-process and importance of decision-making in real life situations.
CO2: Understand different techniques of optimization, which help in analyzing the process of decision-making.
CO3: Problem formulation of optimization.
CO4: Realization of methods for optimization.
CO5: The applications of optimization.
CO6: Understand basic concepts of linear programming and Dynamic Programming.

Course Contents:

UNIT I

Organizational behavior and management. Introduction to O.R. Techniques. Models: - Meaning and classifications.

UNIT II

Linear Programming Problems (L.P.P.), Graphical solutions, Simplex algorithm, Principle of Duality, post optimality analysis. Transportation problem, Initial basic feasible solutions, MODI'S optimality analysis, Degeneracy.

UNIT III

Assignment Problem, traveling Salesmen problem, Branch and Berend techniques. Integer program: - Necessity of Integer programming, use of Branch and Berend Technology for solving Integer Programming problem.

UNIT IV

Queue-theory: - Importance of waiting-line in networking Q-models. Dynamic programming problems.

UNIT V

Theory of Games: - Introduction, pay-off matrix, Minimum-Maximum principle, Saddle-point principle of Dominance. Introduction to Inventory Analysis

Reference Books:

10. Dr. S.D. Sharma, Text Book of Operations Research.
11. N.D. Vora, Quantitative Techniques in management.
12. Kanti Swarup, P.K. Gupta and M.M. Singh , Operations Research..
13. H.A. Taha, Introduction to Operations Research.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

IX SEMESTER

2018 – 2019

Sub. Code	Sub. Name	Credit
IC-901	Object Oriented Analysis and Design	4
IC-902	Compiler Design	4
IC-903	Network & Information Security	4
IC-904	Artificial Intelligence	4
IC-905	Bio Informatics	4
IC-906	Project	4
IC-907	Artificial Intelligence Lab	2
	Comprehensive Viva	4
		30

IC-901
OBJECT ORIENTED ANALYSIS AND DESIGN

Course Outcomes:

CO1: The principle objective of this course is to enable the students to have a thorough understanding of the activities associated to develop projects. And establish the flow of events by making a planning that how software can be shown in its entirety prior to its implementation using Object Oriented Analysis and Design techniques.

CO2: Develop a working understanding of formal object-oriented analysis and design processes.

CO3: Develop the skills to determine which processes and OOAD techniques should be applied to a given project.

CO4: Develop an understanding of the application of OOAD practices from a software project management perspective.

Course Contents:

UNIT I

Object oriented analysis and its design. Software engineering best practices. UML: its road map. Root causes of software failure and symptoms of software failure.

UNIT II

Introduction to the Rational Unified process: Workflow and Lifecycle. Introduction to Object Orientations: problem definition, modeling, using UML modeling mechanisms and there representation.

UNIT III

Requirements Management: key concepts, problem statement, Glossary, use- case model, supplementary specification, functional and nonfunctional requirements.

UNIT IV

Analysis and design overview: architectural analysis-layers. Use case Analysis- Responsibilities, attributes and association, Architectural design.

UNIT V

Describe concurrency, Describe distribution, Use- case design, Subsystem Design, Class design, package.

Reference Books:

1. P.Kruchen, The Rational Unified Process: An Introduction, Pearson EducationAsia, 2000.
2. G. Booch. I. Jacobson, J. Raumbaugh, The Unified Modeling Language- User's Guide, Addison Wesley, 1999.
3. W.Boggs and M. Boggs, Mastering UML with Rational Rose, BPB Publications, 1999.
4. G. Booch, Object oriented Analysis and Design with Applications, Addison Wesley, 1994.
5. M.Blaha, J. Rambaugh, Object oriented modeling and design with UML, Pearson education 2nd edition, 2007.

IC-902
COMPILER DESIGN

Course Outcomes:

CO1: The principle objective of this course is to develop understanding the working of compiler in detail so as to have knowledge of whole spectrum of language processing technology.

CO2: Understand various phases of compilers theoretically as well as practically so as to have the actually feeling of its working.

CO3: Understand some aspects of computation should be covered in course as parsing is of the most important issue in compiler.

CO4: Learn the concepts of symbol table management, syntax-Directed definition and translations along with the code optimization and generation and error handling have to cover to complete the aim.

Course Contents:

UNIT I

Translators, Interpreters, assemblers, Compilers, Types of Compilers, Model of a compiler. Analysis of source program, Phases of a compiler, Cousins of the compilers.

UNIT II

Finite automata, non-deterministic and deterministic finite automata, Acceptance of strings by NDFA and DFA, Transforming NDFA to DFA, minimization/optimization of a DFA, related algorithm. Regular sets and regular expression. Obtaining regular expression from finite automata.

Lexical analyzer design, The role of Lexical Analyzer, Input Buffering, Specification of tokens, and Recognition of tokens.

UNIT III

Syntax analysis, CFG, derivation of a parse tree, elimination of left recursion Regular grammar, Right linear and left linear grammar. Parsing, Top-Down and Bottom Up parsing, general parsing strategies.

Top-down Parsing techniques: Brute-force approach, recursive descent parser and algorithms, Simple LL (1) grammar, LL (1) with null and without null rules grammars, predictive parsing.

Bottom-up parsing- Handle of a right sentential form, Shift-reduce parsers, operator precedence parsing, LR parsing.

UNIT IV

Symbol table contents Organization for block structured languages-stack symbols tables. Stack implemented hash structured symbol tables. Symbol table organization for Object Oriented Programming Languages.

Intermediates code generation, translation schemes for programming language constructs.

Code Optimization: - Definition, Local code optimization techniques, Elimination of local and global common sub Expressions, loop optimization.

UNIT V

Code Generation: - Definition, machine model, simple code generation method. Peephole optimization.

Error Handling: - Error recovery, recovery from various phase and parsing.

Text Books:

1. Alfred V. Aho, Ravi Sethi, Jeffery D. Ullman, Compilers: Principles, Techniques, and Tools, Addison Wesley Longman.

Reference Books:

1. Holub ,Compiler Design in C ,PHI
2. Jean Paul Tremblay, Paul G. Sorenson , The Theory & Practice of Compiler Writing.
3. Barrett, Bates, Gustafson, Couch , Compiler Construction Theory & Practice.

IC-903
Network & Information Security

Course Outcomes:

CO1: The principle objective of this course is to gain understanding of principles and practices of computer system security including operating system security, network security, software security and web security.

CO2: Theoretical foundation of computer network and security and equip the students with an in-depth knowledge of fundamental techniques involved in computer network and security, which helps the students to understand the actual working of computer network and security tools.

CO3: Gain an understanding of the principles of operation of a wide variety of network security technologies.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 years) IX SEMESTER
IC- 903Network & Information Security

Course Objectives
To gain understanding of principles and practices of computer system security including operating system security, network security, software security and web security.

Prerequisites:
Data Structures & Algorithms, Computer Networks

Course Contents

Unit I Information security and Cryptography:
Block and stream ciphers, Cryptographic hash functions, Message Authentication Codes (MAC), Public and private key systems, Message digests. Approximate strength of ciphers, Authentication, Password system. Secure design principles (Least-privilege, fail-safe defaults, complete mediation, separation of privilege), TCB and security kernel construction ,System defense against memory exploits, UNIX security and Security-Enhanced Linux (SELinux), Windows security.

Unit II Data Security Integrity, Vulnerability Exploitation:
Vulnerability auditing, penetration testing, Sandboxing ,Control flow integrity

Unit III Network and Web Security: TCP/IP security issues, DNS security issues and defenses, TLS/SSL, Network Intrusion detection and prevention systems, Firewalls, User authentication, authentication-via-secret and session management, Cross Site Scripting, Cross Site Request Forgery, SQL Injection .

Unit IV Resource Protection models, Side channel attacks, Authentication models: Authentication methods , various side channels and methods of encoding information, the tradeoffs of side-channel protection and system usability.

Unit V Trusted Computing, Legal and Ethical Issues: Cybercrime and computer crime, Intellectual property, copyright, patent, trade secret, Hacking and intrusion, Privacy, identity theft.

Text Readings
~~1. Computer Security :Art and Science(2nd version) — Author ?~~ Recommend one or two text books.

References :

1. W.Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education, 2003.
2. Mann, Mitchell, Krell, "Linux System Security", 2nd Edition, Pearson Education, 2003.
3. Robert, C. Newman, "Enterprise Security", Pearson Education, 2003.
4. Kaufman, Perlman and Speciner, "Network Security, Private Communication in a Public Network", Prentice Hall of India, 2003.
5. Nortcutt & Judy Novak, "Network Intrusion Detection", 3rd Edition, Pearson Education, 2003.

Web Sites:
1. www.infosecuritymag.com
2. www.list.gmu.edu

Baldev

6/1/18

Also include data security topics as discussed. Unit V may be revised accordingly.

IC-904
ARTIFICIAL INTELLIGENCE

Course Outcomes:

CO1: The principle objective of this course is to familiarize students with techniques of representing knowledge required to build intelligent machines capable of taking decision like human beings.
CO2: Understand techniques of solving problems that need human intelligence.
CO3: Understand to formulate Artificial Intelligence problems
CO4: Heuristic techniques to solve the AI problem.

Course Contents:

Unit-I

Introduction to AI & Problem Solving in AI:
What is AI, AI Techniques, Defining the Problem in AI, Problem Spaces, Problem Characteristics, Production System and its Characteristics.

Unit-II

Heuristic Search Techniques: Heuristic Search, Criteria for Success, various search techniques-Generate and Test, Depth and Breadth First, Hill Climbing , Best first Search, A* algorithm.

Unit-III

Knowledge Representation and Issues: Types of Knowledge, Representation and mapping, approaches and issues in knowledge representation, Predicate Logic- representation of simple facts, computable functions, resolution, logic programming, matching, control knowledge.

Unit-IV

Prolog Programming:
Introduction and applications, facts, objects and predicates, Linguistic variables, Rules, input-output operations, controlling execution: Recursion, fail; Arithmetic operations, List, dynamic databases; expert system design.

Unit-V

Knowledge Representation Techniques and Advanced AI: Slot and filler structure – introduction, weak and strong structure, semantic nets, frames, conceptual dependency and Frames; fuzzy logic and robotics, Expert system-concept and design.

Reference Books:-

1. Artificial Intelligence: Elaine Rich and Kevin Knight (TMH publication)
2. Introduction to AI and expert systems: D.W. Patterson (PHI publication)
3. Essential References: Artificial Intelligence: Petric Henry Winston (Addison-Wesley)
4. N.J.Nilson: Principles of Artificial Intelligence, Narosa Publications.
5. Introduction to Turbo Prolog: Carl Townsand(BPB publication)

IC-905
BIO-INFORMATICS

Course Outcomes:

CO1: This course provides an introduction to the analysis of biological data using computational methods, as well as investigating problems in molecular and biology from a computational perspective.

CO2: Develop an understanding of the basic principles of molecular and cell biology.

CO3: Become familiar with existing tools and resources for computational analysis of biological data, including sequences, phylogenies, microarrays, ontologies, and bio- molecular interactions.

CO4: Understand basic abstractions and computational approaches used for analysis including data warehouses, data mining, programming languages.

Course Contents:

UNIT I

What is bioinformatics? Definitions and concepts, Objectives/goals of Bioinformatics, Importance of Bioinformatics , Genome projects, DNA, RNA,DNA fingerprinting , types of RNA, functions of mRNA, tRNA, and rRNA, Amino Acids, Proteins, Central Dogma of Molecular Biology, Gene Coding,& Expression ,Genetic disorder , cloning.

UNIT II

Molecular Biology, RNA, DNA , Protein structure, DNA Sequencing, Base Pairs,Mutations and its type, Sequence Alignment, Dot plots, Simple Alignment. Scoring Matrices. Algorithms Pair wise sequence alignment - NEEDLEMAN and Wunsch, Smith Waterman algorithms; Multiple sequence alignments - CLUSTAL, PRAS; Patterns, motifs and Profiles in sequences.

UNIT III

Biological Databanks, Data Mining, Data warehousing, data capture, data analysis; Introduction to Nucleic Acid and Protein Sequence Data banks; Nucleic acid sequence data banks: Genbank, EMBL nucleotide sequence data bank, Protein sequence data banks: NBRF-PIR, SWISSPROT, Signal peptide data bank; Database Similarity Searches: BLAST, FASTA, PSI-BLAST algorithms.

UNIT IV

Programming Languages, Programming in C: Pointers, pointers to functions, macro and programming in C, graphs, data structure– linked list, stack, queue, binary trees, threaded binary trees, File and exception handling in C.

PERL: Strings, Numbers, and Variables. Variable Interpolation, Basic Input and Output, File handles, Making Decisions, Conditional Blocks, Loops, Combining Loops with Input, Standard Input and Output, Finding the Length of a Sequence File, Pattern Matching, Extracting Patterns, Arrays, Arrays and Lists, Split and Join, Hashes, A Real-World Example, BioPERL; Applications.

UNIT V

Bioinformatics medicine, Preventative medicine , Gene therapy ,Drug development | Alternative energy sources, personalized medicine, crop improvement, forensics analysis, Biotechnology etc. Machine learning overview, Neural networks, , Phylogenetic trees

Reference Books:

1. Pierre Baldi and Søren Brunak, Bioinformatics, The Machine Learning Approach, second edition, MIT Press, Cambridge, MA, 2001.
2. Dan E. Krane, Michael L. Raymer , Fundamental Concepts of Bioinformatics.

3. James Tisdall, Beginning Perl for Bioinformatics.
4. Cynthia Gibas, Per Jambeck , Developing Bioinformatics Computer Skills.
5. Arthur M. Lesk , Database Annotation in Molecular Biology: Principles and Practice.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

M.C.A. (6 Years)

X SEMESTER

2018 – 2019

Sub. Code	Sub. Name	Credit
IC-1001	Data Mining and Warehousing	4
IC-1002	Parallel Processing & Distributed Computing	4
IC-1003	Enterprise Computing Technique	4
IC-1004	Managerial Economics	4
IC-1005	Elective I	4
IC-1006	Enterprise Computing Technique Lab	2
	Comprehensive Viva	4

Elective I

Multimedia Computing
Software Testing & Quality Assurance
Principal of Programming Language

IC-1001
DATA MINING AND WAREHOUSING

Course Outcomes:

CO1: The principle objective of this course is to understand data warehouses and data mining with recent trends and development and trends in the field.
CO2: Understand basic concepts of data warehousing and data mining.
CO3: On Line Analytical Processing (OLAP)
CO4: Data mining techniques and understand various algorithms.

Course Contents:

UNIT I

Data Warehouse, Evolution, Definition, Very large database, Application, Multidimensional Data Model, OLTP V/s Data Warehouse, Warehouse Schema, Data Warehouse Architecture. Data Warehouse Server, Data Warehouse Implementation, Metadata, Data Warehouse Backend Process: Data Extraction, Data Cleaning, Data Transformation, Data Reduction, Data loading and refreshing. ETL and Data warehouse, Metadata.

UNIT II

Structuring/Modeling Issues, Derived Data, Schema Design, Dimension Tables, Fact Table, Star Schema, Snowflake schema, Fact Constellation, De-normalization, Data Partitioning, Data Warehouse and Data Marts. OLAP, Strengths of OLAP, OLTP V/s OLAP, Multidimensional Data, Slicing and Dicing, Roll-up and Drill Down, OLAP queries, Successful Warehouse, Data Warehouse Pitfalls, DW and OLAP Research Issues, Tools.

UNIT III

Fundamentals of data mining, Data Mining definitions, KDD V/s Data Mining, Data Mining Functionalities, From Data Warehousing to Data Mining, DBMS V/s DM, Issues and challenges in Data Mining. Data Mining Primitives, Data Mining Query Languages. Data Mining applications-Case studies.

UNIT IV

Association rules: Methods to discover association rules. Various algorithms to discover association rules like A Priori, partition, Pincer search, Dynamic Itemset Counting Algorithm and more.

UNIT V

Classification Technique: Decision Trees, Web Mining, Web content mining, Web Structure mining, Text mining, Temporal Mining and Spatial Data Mining.

Text Books:

1. ARUN K PUJARI, Data Mining Techniques, University Press
2. JIAWEI HAN & MICHELINE KAMBER, Data Mining – Concepts and Techniques, Harcourt India

Reference Books:

1. W. H. Inmon, Building the Data Warehouse, Wiley Dreamtech India Pvt. Ltd
2. RALPH KIMBALL, The Data Warehouse Life cycle Tool kit, WILEY STUDENT EDITION

IC-1002
PARALLEL PROCESSING & DISTRIBUTED COMPUTING

Course Outcomes:

CO1: The principle objective of this course is to understand the concepts of design hardware of Parallel systems and its components.
CO2: Learn concept of parallel processing.
CO3: Understand various model of parallel computing.
CO4: Understand distributed computing systems.

Course Contents:

Unit I Introduction
Parallel Computing, Parallel Architecture, Architectural Classification Scheme, Classification Based on Grain Size, Bernstein Conditions for Detection of Parallelism, Performance Metrics for Processors

Unit II Design aspect of pipelining, ways to improve performance of pipeling, Job sequencing and collision, MAL, Advance pipelining techniques,
SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, Data Mapping and memory in array processors, interconnection network for SIMD, Memory interleaving, Case studies of SIMD parallel Processors.

Unit III Multiprocessor Architectures, Study and Comparison of loosely and tightly coupled multiprocessors.
Crossbar switch, Multiport Memory Model, Memory contention and arbitration techniques, Cache coherency and bus snooping.

Unit IV Introduction to Distributed Systems
Definition, Issues, Goals, Types of distributed systems, Distributed System Models, Hardware concepts, Software Concept, Models of Middleware, Services offered by middleware, Client Server model.

Unit V Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach, Introduction to process management, process migration, Threads, Virtualization, Code Migration.

Text Books

1. Computer Architecture and Parallel Processing – Kai Hwang and Faye A. Briggs, McGraw-Hill
2. Andrew S. Tanenbaum and Maarten Van Steen, "Distributed Systems: Principles and Paradigms, 2nd edition, Pearson Education, Inc., 2007, ISBN: 0-13-239227-5.

IC-1003
ENTERPRISE COMPUTING TECHNIQUE

Course Outcomes:

CO1: The principle objective of this course is to enable the students understand the concepts of EJB and build web-based and/or enterprise-based applications that incorporate EJB technology.
CO2: Implement business-tier functionality using EJB technology
CO3: Learn the concepts and implementation of RMI and JNDI
CO4: Get an overview of EJB fundamentals.
CO5: Learn the concepts and implementation of Entity and Session beans

Course Contents:

UNIT I

RMI: Object Serialization, Developing Applications with RMI, and the RMI security manager, Parameters passing in RMI.

UNIT II

JNDI: Naming services, Directory services, Benefits of JNDI, JNDI Architecture, JNDI concepts

UNIT III

Overview & EJB Fundamentals: Motivation for EJB, Component architecture, Various roles in J2EE architecture, Type of Beans, Distributed object & Middleware, Constituents of enterprise beans: Enterprise beans class, EJB Object, Home object, Local interfaces, Deployment description, Vendor specific files.

UNIT IV

Session Beans: Stateless session beans, statefull session beans, characteristics of statefull session beans, lifecycle diagram for session beans. JMS, Integrating JMS with EJB, Developing message driver beans.

UNIT V

Entity Beans: Persistence concepts, Features of entity beans, Bean managed Persistent entity beans, and Container managed persistent entity beans, Life cycle Diagrams, BMP and CMP relationships.

Text Books:

1. Ed Roman "Mastering Enterprise Java Beans", Wiley Publishing, 2005, 3rd Edition

Reference Books:

1.P G Sarang ,Kyle Gabhart Professional EJB wrox publication
2.Richard Monson-Haefel ,Bill, Burke,Enterprise java beans 3.0,5 th Ed Developing Enterprise Java Components,O'Reilly Media
2. Ahmed "Professional JAVA server programming", SPD, 2005
3. J2EE Tutorial from www.java.sun.com

IC-1004
MANAGERIAL ECONOMICS

Course Outcomes:

CO1: The principle objective of this course is to provide students with a basic understanding of the economic theory that will have application in their professional life.

CO2: Management students are expected to understand and apply the concept of economics, especially for decision making of firm, with reference to various functional area of modern management.

Course Contents:

UNIT I

Introduction - Managerial economics – Meaning, definitions, importance, Significance, scope of managerial economics. Related disciplines & managerial economics.

UNIT II

Demand concept- Demand:- Concept, Types, Function, Cardinal Utility Approach, Consumer surplus, Law of Diminishing managerial utility, Elasticity of Demand, Demand Forecasting

UNIT III

Production & Cost Analysis –Supply and Law of Supply,Production Analysis, Law of variable Proportion, Return to scale, Isoquants & least cost combination of inputs, Ridge lines and Expansion Path. Cost: - Concept & Types, Short Run and Long run cost Analysis

UNIT IV

Market Structure:- Price determination under different markets: - Perfect competition, Monopoly, Monopolistic competition, Oligopoly

UNIT V

National Income and Inflation: -National Income and its variants, Measures of national products and methods used, National Income in India. Inflation and types of Inflation, inflationary Gap, Causes and consequences of inflation, Reflation, Deflation; Trends and measurement of inflation in Indian economy. Monetary & Fiscal Policies.

Reference Books:

1. Morden micro Economics - Koutsoyiannis
2. Managerial Economics: - Peterson &Levis
3. Micro Economics – Sundaram&Vaish
4. G. Mankiw: - Macro Economics
5. Dornbusch& Fischer: - Macro Econiomics

IC-1005
MULTIMEDIA COMPUTING

Course Outcomes:

CO1: The principle objective of this course is to critically analyze and synthesize the key components of multimedia technologies including text, graphics, voice, video and animation;

CO2: evaluate the role of multimedia technologies in the online and web environment;

CO3: be able to define the characteristics of each media type and describe their application;

CO4: develop, edit and improve interactive web pages that incorporate a variety of digital media such as graphics, voice, animation and video;

CO5: critically evaluate the implications of copyright in the use of multimedia;

CO6: Research and analyze the protocols, standards and representation techniques used for storage and transmission of multimedia information.

CO7: Hands on Experience on latest development in the field of Multimedia and related fields

Course Contents:

Unit-I Multimedia: Introduction and Applications

Introduction to Multimedia, Motivation and Applications, Signals and Waves, Analog and Digital Data, Components of multimedia , Sampling and Quantization; Fundamentals of Information theory, Multimedia Authoring tools. Basics of Data Compression: - Run-length, Huffman, Arithmetic.

Unit-II Fundamentals of Image

Image Data Representation, Colour Models: RGB, YCbCr; Main Image File Formats: Bitmap Files; Halftonning, Dithering; Lossless Image Compression: Run-length Coding (pcx), Lossy Image Compression, Cosine Transform Based Coding (jpeg).

Unit-III Basics of Digital Audio

Introduction to Digital Audio, Representing Audio Data, WAV Audio Format, Audio Data Compression, MP3, MIDI concepts, Audio memory representation.

Unit-IV Basics of Video

Video: Digitization of video, Video capturing , Video transmission standards; EDTV, CCER, CIF, SIF, HDTV, Video formats: H-26I, H-263. MPEG Video compression. Video streaming. Study and analysis of video formats, compression and streaming.

Unit-V Multimedia Network Communication

Multimedia Communication and applications, Study of Multimedia networking, Quality of data transmission, Multimedia over IP, Media on Demand.

Applications: Media Entertainment, Media consumption, web-based applications, e-learning and education, Different Multimedia applications, Analysis and development of Multimedia application

Books Recommended:

[1] Ralf Steinmetz & Klara Nahrstedt, Multimedia: Computing, Communications & Applications, Pearson Education Asia
[2] Tay Vaughan, Multimedia: Making It Work, Mc-Graw hill, Osborne Media
[3] Jerry D. Gibson, Multimedia Communications, Directions and Innovations
[4] J.Jeffcoate, Multimedia in practice, Technology & Application, PHI 1995.
[5] Ze-Nian-Li, Fundamentals of Multimedia, Pearson Education
[6] S. Annadurai & R. Shanmugalakshmi, Fundamentals of Digital Image Processing Pearson Education

IC-1005

SOFTWARE TESTING AND QUALITY ASSURANCE

Course Outcomes:

CO1: The principle objective of this course is to understand software testing process, planning, strategy, criteria and testing method, as well as software quality assurance concept & control process.

CO2: Study of software testing and quality control concepts, principles, methodologies, management strategies and technique

CO3: Understand test models, test design technique (black box and white box testing techniques), testing strategies and advance testing techniques.

Course Contents:

Unit I SOFTWARE TESTING BASICS

Testing as an engineering activity, Role of process in software quality, Testing as a process, Basic definitions, Software testing principles, The tester's role in a software development organization, Origins of defects, Defect classes, The defect repository and test design, Defect examples,Developer / Tester support for developing a defect repository.

Unit II TESTING TECHNIQUES AND LEVELS OF TESTING

Using White Box Approach to Test design - Static Testing Vs. Structural Testing, Code Functional Testing, Coverage and Control Flow Graphs, Using Black Box Approaches to Test Case Design, Random Testing, Requirements based testing, Decision tables, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing, Levels of Testing -Unit Testing, Integration Testing, Defect Bash Elimination. System Testing - Usability and Accessibility Testing, ConfigurationTesting, Compatibility Testing.

Unit III TESTING TECHNIQUES AND LEVELS OF TESTING

Using White Box Approach to Test design - Static Testing Vs. Structural Testing, Code Functional

Testing, Coverage and Control Flow Graphs, Using Black Box Approaches to Test Case Design, Random Testing, Requirements based testing, Decision tables, State-based testing, Cause-effect graphing, Error guessing, Compatibility testing, Levels of Testing -Unit Testing, Integration Testing, Defect Bash Elimination. System Testing - Usability and Accessibility Testing,Configuration Testing, Compatibility Testing.

Unit IV SOFTWARE TEST AUTOMATION AND QUALITY METRICS

Software Test Automation, Skills needed for Automation, Scope of Automation, Design and Architecture for Automation, Requirements for a Test Tool, Challenges in Automation Tracking the Bug, Debugging. Testing Software System Security - Six-Sigma, TQM - Complexity Metrics and Models, Quality Management Metrics, Availability Metrics, Defect Removal Effectiveness, FMEA, Quality Function Deployment, Taguchi Quality Loss Function, Cost of Quality.

Unit V FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE

SQA basics, Components of the Software Quality Assurance System, software quality in business context, planning for software quality assurance, product quality and process quality, software process models, 7 QC Tools and Modern Tools.

Unit VI QUALITY ASSURANCE MODELS and SOFTWARE QUALITY ASSURANCE TRENDS

Models for Quality Assurance, ISO-9000 series, CMM, CMMI, Test Maturity Models, SPICE, Malcolm Baldrige Model- P-CMM.Software Process- PSP and TSP, OO Methodology, Clean-

room software engineering, Defect Injection and prevention, Internal Auditing and Assessments, Inspections & Walkthroughs, Case Tools and their Affect on Software Quality.

Text Books

1. Srinivasan Desikan, Gopalaswamy Ramesh,Software Testing: Principles and Practices Pearson.
2. Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson Addison Wesley.

Reference Books

1. Aditya P. Mathur, Foundations of Software Testing, Pearson.
2. Paul Ammann, Jeff Offutt, Introduction to Software Testing, Cambridge University Press.
3. Paul C. Jorgensen, Software Testing: A Craftsman's Approach, Auerbach Publications.
4. William Perry, Effective Methods of Software Testing, Wiley Publishing, Third Edition.
5. Renu Rajani, Pradeep Oak, Software Testing – Effective Methods, Tools and Techniques, Tata McGraw Hill.
6. Stephen Kan, Metrics and Models in Software Quality, Addison – Wesley, Second Edition.
7. S.A.Kelkar, Software quality and Testing, PHI Learing, Pvt, Ltd.
8. Watts S Humphrey, Managing the Software Process ,Pearson Education Inc.

IC- 1005

PRINCIPLES OF PROGRAMMING LANGUAGES

Course Outcomes:

CO1: The principle objective of this course is to describe syntax and semantics of programming languages data, data types, and basic statements.

CO2: Understand call-return architecture and ways of implementing them.
Understand object-orientation, concurrency, and event handling in programming
Languages develop programs in non-procedural programming paradigms.

Course Contents:

UNIT I SYNTAX AND SEMANTICS

Evolution of programming languages – describing syntax – context-free grammars – attribute grammars – describing semantics – lexical analysis – parsing – recursive-decent – bottomup parsing

UNIT II DATA, DATA TYPES, AND BASIC STATEMENTS

Names – variables – binding – type checking – scope – scope rules – lifetime and garbage collection – primitive data types – strings – array types – associative arrays – record types – union types – pointers and references – Arithmetic expressions – overloaded operators – type conversions – relational and boolean expressions – assignment statements – mixedmode assignments – control structures – selection – iterations – branching – guarded statements

UNIT III SUBPROGRAMS AND IMPLEMENTATIONS

Subprograms – design issues – local referencing – parameter passing – overloaded methods – generic methods – design issues for functions – semantics of call and return – implementing simple subprograms – stack and dynamic local variables – nested subprograms – blocks – dynamic scoping

UNIT IV OBJECT-ORIENTATION, CONCURRENCY, AND EVENT HANDLING

Object-orientation – design issues for OOP languages – implementation of object-oriented constructs – concurrency – semaphores – monitors – message passing – threads – statement level concurrency – exception handling – even handling

UNIT V FUNCTIONAL AND LOGIC PROGRAMMING LANGUAGES

Introduction to lambda calculus – fundamentals of functional programming languages – Programming with Scheme – Programming with ML – Introduction to logic and logic programming – Programming with Prolog – multi-paradigm languages

REFERENCES:

1. Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012.

2. Michael L. Scott, “Programming Language Pragmatics”, Third Edition, Morgan Kaufmann, 2009.
3. R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009.
4. Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998.
5. Richard A. O'Keefe, “The craft of Prolog”, MIT Press, 2009.
6. W. F. Clocksin and C. S. Mellish, “Programming in Prolog: Using the ISO Standard”, Fifth Edition, Springer, 2003.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

M.C.A. (6 Years)

XI SEMESTER

2018 – 2019

Code	Subject	L	T	P	C
IC-1101	Wireless and Mobile Computing	3	1	0	4
IC-1102	Enterprise Resources Planning	3	1	0	4
IC-1104	Elective II	3	1	0	4
IC-1105	Research Methodology & Practices	3	1	4	6
IC-1106	Wireless and Mobile Computing Lab	0	0	4	2
	Comprehensive Viva				4
					24

Elective II

Cloud Computing
Design Patterns
Image Processing

IC-1101
MOBILE & WIRELESS COMPUTING

Course Outcomes:

CO1: The principle objective of this course is to acquire solid knowledge on mobile networks and mobile computing
CO2: acquire experience and capability to team work
CO3: select components and networks for particular application
CO4: creatively analyze mobile and wireless networks
CO5: critically analyse security issues of mobile and wireless computing systems

Course Contents:

Unit-I

Overview of the emerging field of mobile computing; Historical perspectives (mainly from the perspective of radio), Land mobile vs. Satellite vs. In-building communications systems, RF vs. IR. Characteristic of Cellular Systems, Mobility support in cellular telephone networks, Personal Communications Systems/Personal Communications Networks, Mobile applications, Limitations, Health Concerns.

Mobile communication: Fiber or wire based transmission, Wireless Transmission: Frequencies, Antennas and Signal Propagation – path loss of radio signals, Additional signal propagation effect, Multipath propagation.

Modulation Techniques, Multiplexing techniques, Coding techniques, Multiple Radio Access – Introduction Contention based protocols, Channel Allocation

Unit-II

The Cellular Concept : Introduction, Cell Area, signal strength and cell parameters, capacity of a cell, Frequency reuse, Co-channel Interference, Cell splitting, Cell Sectoring.

Mobile Communication System : Introduction, Cellular System Infrastructure, Registration, Handoff support, Multicasting, Authentication & security, frequency hopping.

Unit-III

Mobile IP, goals, assumptions requirements, entities & terminology, IP packet delivery, tunnelling and encapsulation, Feature & formate IPv6, DHCP, TCP over Wireless.

Cyclic repetition of data, Digital Audio Video Broadcasting, Multi media object transfer Protocol, Wireless LAN topologies, requirements

Physical layer, MAC layer, IEEE802.11: Protocol architecture, layers, Information bases and networking, Bluetooth.

Case Study on Wireless LAN infrastructure.

Satellite Systems: History, Application, and Basics of Satellite Systems: LEO, MEO, GEO, Routing, Handover, VSAT, installation & Configuration.

Unit-IV

Characteristic of Ad Hoc networks, Applications, need for routing, routing classification, Wireless sensor networks, classification & Fundamental of MAC protocol for wireless sensor networks.

Unit-V

Mobile operating System, file system, Process, Task, Thread, ISR and IST, CODA, HTTP versus HTML.WML, XML application for wireless handheld devices.

Mobile devices : Server & Management – Mobile Agent, Application Server, Gateways, Device Management, Mobile File Systems

Text Books:

A: Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.

B: Wireless And Mobile Systems author D P Agrawal & Qing-An zeng, publication Thomson.

C: Wireless Networks author P Nicopotidis, publication Addision –Wesley-An zeng publication

D: Mobile Computing author Dr. Rajkamal, publication Oxford University Press

IC-1102
ENTERPRISE RESOURCE PLANNING

Course Outcomes:

CO1: The principle objective of this course is to develop the knowledge and skills to address the challenges of successful implementation of ERP.

CO2: Learning skills of re-engineering business process to fit the ERP, risk factor associated with managing ERP systems.

CO3: Provide foundation for e-business etc.

Course Contents:

Unit I Process view of organization

Introduction to business process, Business Functional areas, Introduction to information Systems, problems of organizational functional division, Introduction of Enterprise Systems, Evolution of Enterprise applications, Technology as process enabler**,** mapping an existing organizational process, Process redesign, and new process validation.

Unit II Approaches to Business Process Re-engineering

Salient features of Re-engineering, Re-engineering initiatives, Managerial implications of process Re-engineering efforts, Kaizen, Total Quality Management, Implementing new process, Critical success factors of re-engineering projects, comparison of different re-engineering approaches,

Unit III Introduction to Enterprise Resource Planning

Reasons for the growth of ERP market, ERP packages role, Enterprise application implementation projects, Rationale for ERP, Enterprise architecture planning, Selection of an ERP vendor, Contracts with ERP vendors, consultants and employees. ERP Project Management and monitoring, Pitfalls of ERP packages, ERP implementation life cycle, Implementation methodology, organizing the implementation, Overview of ERP modules.

Unit IV ERP Supply Chain and CRM application

ERP market place **-**SAP AG, PeopleSoft, Baan, JD Edwards Oracle applications, ERP and related technologies. Overview of supply chain and demand chain, Supply chain framework, Benefits of Supply chain, advanced planning systems. Introduction to CRM applications, growth of CRM applications, Benefits of CRM applications.

Unit V ERP Package application

Detailed study of any one ERP package with emphasis on application basics, cross sectional analysis of other ERP system with the application. Package architecture, understanding of the application with current Business Process reference model. Case Studies on ERP implementation at BPCL, CRM initiative at 3M, Mobile CRM, DOW chemical e-CRM strategy, Sear Logistics Management Practices.

Text Books

1. Enterprise Resource Planning by Mary Sumner, Fifth edition, Pearson Education.
2. Enterprise Resource Planning –Alexis Leon -Tata McGraw Hill publication.

Reference Books

1. John David Patrick and M.A. Rashid- Idea Group publishing.

2. Concepts in Enterprise Resource Planning - Brady, Monk and Wagner, Thomson Learning.
3. CRM at the speed of Light .- Greenberg , Paul – TMH
4. ERP strategy – Vinod Kumar Garg , Bharat Vakharia , Jaico.
5. The E-Marketplace: Strategies for success in B2B commerce – Raisch,Warren D McGraw Hill inc.2000.

IC-1104
CLOUD COMPUTING

Course Outcomes:

CO1: The principle objective of this course is to Understand basic concepts of cloud computing, its tools and Identify appropriate applications.
CO2: Select and define appropriate technology and parameters.
CO3: Demonstrate knowledge of market based cloud computing ;
CO4: Perform the reviews of different clouds applications.

Course Contents:

Unit-I

Introduction: Historical development, Vision of Cloud Computing, Characteristics of cloud computing as per NIST, Cloud computing reference model, Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments. Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis, Satellite Image Processing, CRM and ERP, Social networking .

Unit-II

Cloud Computing Architecture: Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance,

Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management.

Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

Unit –III

Cloud Management & Virtualization Technology: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits.

Unit-IV

Cloud Security: Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.

Unit-V

Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services.
Case study: Google App Engine, Microsoft Azure.

Recommended Text:

1. Buyya, Selvi ," Mastering Cloud Computing ",TMH Pub
2. Kumar Saurabh, "Cloud Computing" , Wiley Pub
3. Krutz , Vines, "Cloud Security " , Wiley Pub
4. Velte, "Cloud Computing- A Practical Approach" ,TMH Pub
5. Sosinsky, " Cloud Computing" , Wiley Pub

IC-1104
DESIGN PATTERN

Course Outcomes:

CO1: The principle objective of this course is to strengthen the knowledge of Object Oriented Design and development by understanding various design patterns for object oriented reusable Software.
CO2: Understand the concept of Design patterns and its importance.
CO3: Understand the behavioral knowledge of the problem and solutions
CO4: Relate the Creational, Structural , behavioral Design patterns
CO5: Apply the suitable design patterns to refine the basic design for given context.

COURSE CONTENTS

I Review of Object Orientation
Introduction to Software Patterns, Overview of UML, Class Diagrams, Collaboration Diagrams, State chart Diagram, Deployment Diagram,

II Introduction
Introduction to design pattern, describing design pattern, design Pattern for solving problem, selection of design pattern, use of design pattern. Fundamental Design Patterns: Delegation, Interface, Abstract Super-class, Interface and Abstract class, Marker Interface.

II Creational Pattern
Simple Factory pattern, Factory Method, Abstract Factory, Builder, Prototype, Singleton

III Structural Pattern
Adaptor, Bridge, Composite, Façade, Flyweight, Decorator, Proxy Pattern

IV Behavioral Pattern I
Chain of Responsibility, Command, Interpreter, Mediator, Memento Pattern

V Behavioral Pattern II
Observer, State, Strategy, Template Method, Visitor, Iterator Pattern

Text Book

1. Gamma, Helm, Johnson, Vlissides, Design Patterns. Elements of Reusable Software., Pearson Education 2006

Reference Book

1. Cooper, J. W., Java Design Patterns, A Tutorial, Pearson Education, 2000.
2. Freeman, Freeman, Head First Design Patterns, O'Reilly Pub. 2007
3. Mark Grand, Patterns in Java Vol. 1, Wiley 2002
4. Mark Grand, Patterns in Java Vol. 2, Wiley 2002
5. Mark Grand, Patterns in Java Vol. 3, Wiley 2002

IC-1104
IMAGE PROCESSING

Course Outcomes:

CO1: The principle objective of this course is to Explain how digital images are represented and manipulated in a computer, including reading and writing from storage, and displaying.

CO2: Write a program which implements fundamental image processing algorithms.

CO3: Be conversant with the mathematical description of image processing techniques and know how to go from the equations to code.

Course Contents:

UNIT I DIGITAL IMAGE FUNDAMENTALS

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

UNIT II IMAGE ENHANCEMENT

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT III IMAGE RESTORATION AND SEGMENTATION

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

UNIT IV WAVELETS AND IMAGE COMPRESSION

Wavelets – Subband coding - Multiresolution expansions - Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

UNIT V IMAGE REPRESENTATION AND RECOGNITION

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

Text books:

1.Digital Image Processing and Computer Vision, Sonka, lavac, Boyle, Cenage Learning.
2.Digital Image Processing, R.C. Gonzalez, R.R. Woods(TMH)
3.Digital Image Processing And Analysis, PHI, B. Chanda, D.Datta Mujumdar.

References Books:

1.Anil Jain, "Fundamentals Of Digital Image Processing", Anil Jain PHI, ISBN-81- 203-0929-4
2.Digital Image Processing using MATLAB, R.C. Gonzalez, R.R. Woods(Person), 2nd Edition.

3. Digital Image Processing, S.Jayaraman, T. Veerakumar (Mc Graw Hill).
4.Introduction to Digital Image Processing with MATLAB, Alasdair McAndrew, Cenage Learning

IC-1105
RESEARCH METHODOLOGY &PRACTICES

Course Outcomes:

CO1: The principle objective of this course is to Understand basic concepts of research, its methodologies and Identify appropriate research topics.
CO2: Select and define appropriate research problem and parameters.
CO3: Demonstrate knowledge of research processes (reading, evaluating, and developing);
CO4: Perform literature reviews using print and online databases.

Course Contents:

Unit-1:
The Information Systems and Computing disciplines, Evidence-based practice, The Internet, and Research.
Definition and characteristics of Research, Evaluating research, Rigour, and relevance in research, The 6 P of Research, The purpose and products of research: Reasons for doing research, possible products/outcomes of the research, Finding and choosing research topics, Evaluating the purpose and products of research.

Unit-2:
Overview of the Research: A model of the research process, alternatives models of the research process, Evaluating the Research process. Need, types and applications of simulators for researching in CS.

UNIT-3:
Reviewing the literature: Purpose and resources of literature review, The internet, and literature reviews conducting a literature review Evaluating literature review Evaluating literature review. Surveys: Defining surveys, Planning and designing surveys, Grounded theory, and surveys, The internet and surveys, Examples of surveys in IS and computing research, Evaluating survey-based research. Interview, Observations, Questionnaire.

UNIT-4:
Design and Creation: Defining design and creation: planning and conducting design and creation research. Creative computing and digital art. the internet and design and creation research. Examples of designing and creation research in IS and computing, Evaluating design and creation research. Experiments, Case studies, Action Research, Ethnography, Documents.

UNIT-5:
Internet Research: Background to the internet and WWW, Internet Research topics, The internet and literature review The internet and research strategies and methods, Internet research, law and ethics. Participants and Research Ethics: The law and research, Rights of people directly involved, Responsibilities of an ethical researcher, Design, and creation of Project and ethics, Evaluating research ethics.

Text Book:
Briony J Oates, Researching information systems and computing, SAGE South Asia Edition,2007 ISBN: 978-81-7829-759-0

Reference Materials:

1. Research Design. Qualitative, Quantitative, and Mixed Methods Approaches. By John W. Creswell, Fourth Edition. SAGE Publication, 2014

2. The Craft of Research, By Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams, Joseph Bizup, William T. FitzGerald, Third Edition, The University of Chicago Press, 2008

3. The Elements of Style. William Strunk Jr. and E. B. White, Fourth Edition, Pearson, 1999

4. Research Methodology By Panneerselvam R, 2nd Edition, PHI, 2014

5. Selecting Empirical Methods for Software Engineering Research, Steve Easterbrook, Janice Singer, Margaret-Anne Storey, D. Damian, Book Chapter in Guide to Advanced Empirical Software Engineering, Forrest Shull, Janice Singer, and Dag I.K. Sjøberg, Springer 2008

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
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M.C.A. (6 Years)

XI SEMESTER

2018 – 2019

Semester XII

Code	Subject	L	T	P	C
IC-1201	Project				24