

Kurukshetra University, Kurukshetra
(Established by the State Legislature Act XII of 1956)
('A+' Grade, NAAC Accredited)

॥ योगस्थः कुरु कर्माणि ॥
समबुद्धि व योग युक्त होकर कर्म करो
(Perform Actions while Stead fasting in the State of Yoga)



Scheme of Examination and Syllabus of Bachelor of Science (B.Sc.) Programme
(Course Computer Science) (CBCS) in Phased Manner

DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS

CBCS CURRICULUM (2020-21)

Program Name: Bachelor of Science (B.Sc.) Programme (Course Computer Science)
(CBCS)

(For the Batches Admitted From 2020-2021)

Programme Outcomes (POs) for Three Year B.Sc. Programme (Course Computer Science)

PO1	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study
PO2	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large
PO3	Problem Solving	Capability of applying knowledge to solve scientific and other problems
PO4	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, in multidisciplinary settings'
PO5	Investigation of Problems	Ability of critical thinking, analytical reasoning and research based knowledge including design of experiments, analysis and interpretation of data to provide conclusions
PO6	Modern Tool usage	Ability to use and learn techniques, skills and modern tools for scientific practices
PO7	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices
PO8	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life
PO9	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development.
PO10	Ethics	Apply ethical principles and professional responsibilities in scientific practices
PO11	Project Management	Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects

Programme Specific Outcomes (PSOs) for Three Year B.Sc. Programme (Course Computer Science)

PSO1	Students will be able to acquire the basic understanding of the principles and working of the hardware and software aspects of computer systems.
PSO2	Explore technical knowledge in diverse areas of Computer Science and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.
PSO3	Papers such as C++, JAVA, Python, Web designing give an effective and efficient real time solution in various domains.

SCHEME OF EXAMINATION FOR B.Sc. Programme (Course Computer Science) under CHOICE BASED CREDIT SYSTEM (CBCS) w.e.f. Academic Session 2020-21 in phased manner

Semester	Course Opted	Course Code	Course Name	Credits	Work load/ hours /week	Exam Time (Hrs.)	External Marks		Internal Marks		Total Marks	
							Max	Pass	Max	Pass	Max	Pass
1	CORE COURSE- III	CC- IIIA	COMPUTER FUNDAMENTALS	3	3	3	60	24	15	6	75	30
		CC- III B	WEB DESIGNING USING HTML AND CSS	3	3	3	60	24	15	6	75	30
	CORE COURSE PRACTICAL	CC- III B (P)	S/W LAB BASED ON CC- III B	2	4	3	40	16	10	4	50	20
	TOTAL			08	10		160	64	40	16	200	80
2	CORE COURSE- VI	CC- VI A	C++ PROGRAMMING -I	3	3	3	60	24	15	6	75	30
		CC- VI B	LOGICAL ORGANIZATION OF COMPUTER	3	3	3	60	24	15	6	75	30
	CORE COURSE PRACTICAL	CC- VI B (P)	S/W LAB BASED ON CC- VI A	2	4	3	40	16	10	4	50	20
	TOTAL			08	10		160	64	40	16	200	80
3	CORE COURSE- IX	CC- IX A	C++ PROGRAMMING- II	3	3	3	60	24	15	6	75	30
		CC- IX B	DATA STRUCTURES	3	3	3	60	24	15	6	75	30
	CORE COURSE PRACTICAL	CC- IX B (P)	S/W LAB BASED ON CC- IX B	2	4	3	40	16	10	4	50	20
	TOTAL			08	10		160	64	40	16	200	80
4	CORE COURSE- XII	CC- XII A	PROGRAMMING IN JAVA	3	3	3	60	24	15	6	75	30
		CC- XII B	OPERATING SYSTEMS	3	3	3	60	24	15	6	75	30
	CORE COURSE PRACTICAL	CC- XII A (P)	S/W LAB BASED ON JAVA	2	4	3	40	16	10	4	50	20
	TOTAL			08	10		160	64	40	16	200	80

5	DISCIPLINE SPECIFIC ELECTIVE-III	DSE-III	ELECTIVE-I	4	4	3	80	32	20	8	100	40	
		DSE-III(P)	S/W LAB BASED ON DSE-III	2	4	3	40	16	10	4	50	20	
	SKILL ENHANCEMENT COURSE-III	SEC-III	ELECTIVE-II	2	2	3	40	16	10	4	50	20	
	TOTAL				08	10		160	64	40	16	200	80
	ELECTIVE-I I. JAVASCRIPT II. DATABASE MANAGEMENT SYSTEM III. SOFTWARE ENGINEERING				ELECTIVE-II I. DATA WAREHOUSING AND MINING II. COMPUTER ORIENTED STATISTICAL METHODS III. COMPUTER NETWORKS								
6	DISCIPLINE SPECIFIC ELECTIVE-VI	DSE-VI	ELECTIVE-III	4	4	3	80	32	20	8	100	40	
		DSE-VI(P)	S/W LAB BASED ON DSE-VI	2	4	3	40	16	10	4	50	20	
	SKILL ENHANCEMENT COURSE-IV	SEC-IV	ELECTIVE-IV	2	2	3	40	16	10	4	50	20	
	TOTAL				08	10		160	64	40	16	200	80
	ELECTIVE-III I. LINUX & SHELL PROGRAMMING II. PROGRAMMING USING PYTHON III. VISUAL PROGRAMMING USING C#				ELECTIVE-IV I. ARTIFICIAL INTELLIGENCE II. INFORMATION SECURITY III. E-COMMERCE								

Total Credits (B.Sc. Programme (Course Computer Science)): $8 + 8 + 8 + 8 + 8 + 8 = 48$

Total Contact Hours (B.Sc. Programme (Course Computer Science)): $10 + 10 + 10 + 10 + 10 + 10 = 60$

- 1. A student can opt for any one paper out of the list of elective papers provided against each paper code for respective semester.**
- 2. One credit equivalent to 1 hour of teaching/2 hours of Practical work**
- 3. One credit equivalent to 25 marks**
- 4. Teaching workload will be calculated on the basis of teaching contact hours of the course.**

CC – III A: COMPUTER FUNDAMENTALS

Type: Core Course (CC)
Course Credits: 03
Contact Hours: 03 hours/week.
Examination Duration: 3 Hours
Mode: Lecture
External Maximum Marks: 60
External Pass Marks: 24
Internal Maximum Marks: 15
Total Max. Marks: 75
Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the this course is to help students to enhance their basic concept of computer hardware, software, memory and operating environments along with the concepts of problem solving using programming languages which will lead to code generation in future for computer science job aspirants.

Course Outcomes: At the end of this course, the student will be able to:

CC – IIIA.1: understand the basic terminology of hardware and software components of a computer system;

CC – IIIA.2: understand the working of input/output device and storage devices;

CC – IIIA.3: develop program logic using algorithms, flowchart, decision tables, DFDs, etc.

CC – IIIA.4: develop sorting, searching, merging and other basic algorithms to solve problems;

CO-PO Mapping Matrix for Course Code: CC – III A											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11
CC – IIIA.1	3	3	2	3	3	2	2	2	2	3	2
CC – IIIA.2	3	2	3	3	3	2	2	2	2	2	2
CC – IIIA.3	3	3	2	3	3	2	2	2	2	3	2
CC – IIIA.4	3	2	3	3	3	2	2	2	2	2	2
Average	3	2.5	2.5	3	3	2	2	2	2	2.5	2

CO-PSO Mapping Matrix for Course Code: CC – III A			
COs	PSO1	PSO2	PSO3
CC – IIIA.1	3	3	2
CC – IIIA.2	2	3	3
CC – IIIA.3	3	3	2
CC – IIIA.4	2	3	3
Average	2.5	3	2.5

UNIT – I

Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields; Software, Types of Software: System software, Application software, Utility Software, Shareware, Freeware, Firmware, Free Software. Hardware components of a computer system - processor, RAM, ROMs, motherboard, power supply etc

UNIT – II

Storage devices: Types of Storage devices, Magnetic tape, Hard disk, Optical disk, Flash memory

I/O Devices: I/O Ports, Device Controller, Device Driver

Input Devices: Classification and use, keyboard, Pointing devices - mouse, touch pad and track ball, Video digitizer, remote control, joystick, magnetic stripes, scanner, digital camera, microphone, sensor, and MIDI instruments

Output Devices: Monitor, printers –classification, laser, ink jet, dot-matrix, plotter, and speaker.

UNIT – III

Planning the Computer Program: Techniques of Problem Solving, Program, Types of Program Errors, Debugging a Program, Testing Program, Documentation: Need & Different Forms.

Developing Program Logic: Algorithm, Characteristics of Good Algorithm, Pseudo Code, Flowchart & its Symbols, Data Flow Diagrams (DFDs), Decision Tables & their types and Decision Trees.

UNIT – IV

Developing Algorithms: Time & space complexity of algorithms, Big-O Notation, Drawing Flowcharts and writing algorithms in pseudo code for basic problems.

Sorting Algorithms: bubble sort, selection sort, insertion sort, quick sort. Searching Algorithms – linear search, binary search. Merging Algorithm.

Text Books:

[1] Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB.

[2] Dromey, R.G., How to Solve it By Computer, PHI.

Reference Books:

[1] Norton, Peter, Introduction to Computer, McGraw-Hill.

[2] Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World.

[3] Rajaraman, V., Fundamentals of Computers, PHI.

CC- III B: WEB DESIGNING USING HTML AND CSS

Type: Core Course (CC)
Course Credits: 03
Contact Hours: 03 hours/week.
Examination Duration: 3 Hours
Mode: Lecture
External Maximum Marks: 60
External Pass Marks: 24
Internal Maximum Marks: 15
Total Max. Marks: 75
Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of web as a tool in presenting information. Each and every product in e-world now needs a website, this course will make student knowing about the concept of web design in general.

Course Outcomes: At the end of this course, the student will be able to:

CC- III B.1: outline the idea of web and its components.

CC- III B.2: understand the theoretical steps for developing a website.

CC- III B.3: learn the skills that will enable him/her to design simple web pages.

CC- III B.4: learn CSS to specify style to web pages.

CO-PO Mapping Matrix for Course Code: CC – III B											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- III B.1	3	1	2	1	1	1	1	2	1	1	1
CC- III B.2	3	2	1	1	1	1	1	2	1	1	1
CC- III B.3	3	2	2	1	1	3	1	2	2	1	1
CC- III B.4	3	2	2	1	1	3	1	2	2	1	2
Average	3	1.75	1.75	1	1	2	1	2	1.5	1	1.3

CO-PSO Mapping Matrix for Course Code: CC – III B			
COs	PSO1	PSO2	PSO3
CC- III B.1	2	2	2
CC- III B.2	2	2	2
CC- III B.3	2	3	3
CC- III B.4	2	3	3
Average	2	2.5	2.5

UNIT – I

Introduction to Internet and World Wide Web (WWW); Evolution and History of World Wide Web, Web Pages and Contents, Web Clients, Web Servers, Web Browsers; Hypertext Transfer Protocol, URLs; Searching and Web-Casting Techniques, Search Engines and Search Tools, Scripting Languages.

UNIT – II

Web Publishing: Hosting website; Internet Service Provider; Planning and designing website; Web Content Authoring, Web Graphics Design, Web Programming, Steps For Developing website, Choosing the Contents, Home Page, Domain Names, Creating a Website and Introduction to Mark up Languages (HTML and DHTML).

UNIT – III

Web Development: HTML Document Features, Fundamentals HTML Elements, Creating Links; Headers; Text styles; Text Structuring; Text colour and Background; Formatting text; Page layouts, Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus;

Working with Radio Buttons; Check Boxes; Text Boxes.

UNIT – IV

Introduction to CSS (Cascading Style Sheets): Features, Core Syntax, Types, Style Sheets and HTML, Style Rule Cascading and Inheritance, Text Properties, CSS Box Model, Normal Flow Box Layout, Positioning and other useful Style Properties; Features of CSS3.

Text Books:

- [1] Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
- [2] Ramesh Bangia, Multimedia and Web Technology, Firewall Media.

REFERENCE BOOKS:

- [1] Thomas A. Powell, Web Design: The Complete Reference, Tata McGraw-Hill
- [2] Wendy Willard, HTML Beginners Guide, Tata McGraw-Hill.
- [3] Deitel and Goldberg, Internet and World Wide Web, How to Program, PHI.

CC- VIA : C++ PROGRAMMING -I

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:

CC- VIA.1: understand basic concept of C++;

CC- VIA.2: acquire the knowledge of C++ operators, hierarchy and precedence and various control structures;

CC- VIA.3: learn to use arrays and string in C++ programs;

CC- VIA.4: get familiar with OOPS concepts with C++.

CO-PO Mapping Matrix for Course Code: CC – VIA											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- VIA.1	3	3	2	3	3	2	2	2	2	3	2
CC- VIA.2	3	2	3	3	3	2	2	2	2	2	2
CC- VIA.3	2	3	3	3	2	2	2	2	1	1	1
CC- VIA.4	3	2	2	2	3	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75

CO-PSO Mapping Matrix for Course Code: CC – VIA			
COs	PSO1	PSO2	PSO3
CC- VIA.1	3	3	2
CC- VIA.2	2	3	3
CC- VIA.3	3	3	3
CC- VIA.4	2	2	2
Average	2.5	2.75	2.5

UNIT – I

Introduction to C++: About C++, Character Set, Keywords, Identifiers, Constants, Punctuators, Date Types: User-Defined, Built-in, Derived Data Types, Access Modifiers, Unformatted and Formatted I/O Operations. I/O using extraction and extraction operators, Type Conversion, Type Casting.

UNIT – II

Operators in C++: Arithmetic, Relational, Logical, Ternary, Precedence & associativity of Operators. Control Structures: if statement, if-else statement, nested if, if-else-if ladder, switch...case statement, break and continue, goto statement, nested switch...case statement, Loops: while loop, do...while loop, for loop.

UNIT – III

Arrays and strings: Array definition, initialization, multidimensional arrays, Manipulation of array elements, String declaration and initialization, Manipulations, String handing functions. Functions: Declaration and Definition, return values, arguments, passing parameters by value, call by reference, call by pointer, Recursions, Inline and external linkage Functions, storage classes.

UNIT – IV

Object-Oriented Features of C++: Class and Objects, Data hiding & encapsulation, abstraction, constructors & destructors, Data Members and Member Functions, accessing class members, empty class, local class, global class, Scope Resolution Operator and its Uses, Static Data Members, Static Member Functions, Structure vs Class.

Text Books:

- [1] Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill
- [2] Robert Lafore, Object Oriented Programming in C++, SAMS Publishing

Reference Books:

- [1] Bjarne Stroustrup, The C++ Programming Language, Pearson Education
- [2] Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.
- [3] Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning.

CC- VI B: LOGICAL ORGANIZATION OF COMPUTERS

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of computer as a system and making student aware of internal mechanism of computer hardware and it's working.

Course Outcomes: At the end of this course, the student will be able to:

CC- VI B.1: understand number systems, error detecting & correcting code and character representations;

CC- VI B.2: understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.

CC- VI B.3: design combinational circuits using logic gates.

CC- VI B.4: design sequential circuits such as registers and counters using flip-flops.

CO-PO Mapping Matrix for Course Code: CC – VI B											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- VI B.1	3	3	2	3	3	2	2	2	2	1	2
CC- VI B.2	3	2	3	3	1	2	2	3	2	2	2
CC- VI B.3	2	3	3	3	2	2	3	2	1	1	2
CC- VI B.4	3	2	2	2	3	3	2	3	3	2	3
Average	2.75	2.5	2.5	2.75	2.25	2.25	2.25	2.5	2	1.5	2.25

CO-PSO Mapping Matrix for Course Code: CC – VI B			
COs	PSO1	PSO2	PSO3
CC- VI A.1	2	1	2
CC- VI A.2	2	1	1
CC- VI A.3	2	2	1
CC- VI A.4	2	2	1
Average	2	1.5	1.25

UNIT – I

Number Systems: Binary, Octal, Decimal and Hexadecimal, Conversions from one number system to another, BCD Codes, Error Detecting and Correcting Codes, Character Representation – ASCII, EBCDIC and Unicode, Binary Arithmetic; Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division, Complementary numbering systems: 1's and 2's Complements representations, Fixed-Point and Floating-Point Representation of Numbers.

UNIT – II

Boolean Algebra: Boolean Algebra Postulates, basic Boolean Theorems, Boolean Expressions, Boolean Functions, Truth Tables, Canonical Representation of Boolean Expressions: SOP and POS, Simplification of Boolean Expressions using Boolean Postulates & Theorems, Karnaugh-Maps (upto four variables), Tabular Method, Handling Don't Care conditions.

UNIT – III

Logic Gates: Basic Logic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR. Their symbols, truth tables and Boolean expressions. Combinational Circuits: Design Procedures,

Half Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers, Demultiplexers, Decoder, Encoder, Comparators, Code Converters.

UNIT – IV

Sequential Circuits: Basic Flip-Flops and their working. Synchronous and Asynchronous Flip-Flops, Triggering of Flip-Flops, Clocked RS, D Type, JK, T type and Master-Slave Flip-Flops. State Table, State Diagram and State Equations. Flip-flops characteristics & Excitation Tables. Designing Registers & Counters: Asynchronous and Synchronous Binary Ripple Counter, Binary Synchronous Counter, Modulo-N Counters and Up-Down Counters.

Text Books:

- [1] M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
- [2] V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall.

Reference Books:

- [1] Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
- [2] Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.

CC- IX A: C++ PROGRAMMING- II

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of C++ (high level language) as one of the programming tool and generating logical development using programming. This course will help students to learn about OOPS concepts and linking C++ as a powerful OOPS language.

Course Outcomes: At the end of this course, the student will be able to:

CC- IX A.1: understand pointers, constructor and destructors in C++;

CC- IX A.2: acquire the detailed knowledge of polymorphism;

CC- IX A.3: learn to implement exception handling and template;

CC- IX A.4: learn File handling in C++.

CO-PO Mapping Matrix for Course Code: CC- IX A											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- IX A.1	3	3	2	3	3	2	2	2	2	3	2
CC- IX A.2	3	2	3	3	3	2	2	2	2	2	2
CC- IX A.3	3	2	3	3	2	2	2	2	1	1	2
CC- IX A.4	3	2	2	2	2	3	3	3	3	2	2
Average	3	2.25	2.5	2.75	2.5	2.25	2.25	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: CC- IX A			
COs	PSO1	PSO2	PSO3
CC- IX A.1	3	3	2
CC- IX A.2	2	3	3
CC- IX A.3	3	3	3
CC- IX A.4	2	2	2
Average	2.5	2.75	2.5

UNIT – I

Pointers & Runtime binding: pointer variable, address operator, void pointer, dynamic memory allocation & deallocation, Pointer arithmetic. Object Initialization and Cleanup: Constructors, types of constructors, destructors, constant objects and constructors. Friend Function & Class: defining friend function and friend class, defining member function of a class as friend function.

UNIT – II

Static Polymorphism: Function Overloading & Operator Overloading, over loadable operators, overloading unary & Binary Operators, Concatenating Strings using Operators overloading,

Inheritance: Definition, Need, derivation types, different Forms of Inheritance, overloading vs overriding.

Dynamic Polymorphism: Virtual and Pure Virtual Functions and their need, Virtual derivation, Virtual Destructor.

UNIT – III

Exception Handling in C++: Exception handling model, Exception handling constructs - try, throw, catch, Order of catch blocks, Catching all exceptions, Nested try blocks, handling uncaught exceptions, unexpected(), terminate() and standard exceptions. Generic Programming: Function template, Overloading of template functions, Member function templates, class templates.

UNIT – IV

File handling: Hierarchy of File Streams, opening & closing files, file modes, file pointers and their manipulation. Sequential access to a file, Text & Binary files, saving and retrieving objects in a file, random access to a file.

Text Books:

- [1] Herbert Schildt, C++, The Complete Reference, Tata McGraw-Hill.
- [2] Robert Lafore, Object Oriented Programming in C++, SAMS Publishing.

Reference Books:

- [1] Bjarne Stroustrup, the C++ Programming Language, Pearson Education.
- [2] Balaguruswami, E., Object Oriented Programming In C++, Tata McGraw-Hill.

CC- IX B: DATA STRUCTURE

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: Learning of data structure is like learning alphabets to learn any proper language. In this course student will be aware of memory management and use of data structure in computer programming.

Course Outcomes: At the end of this course, the student will be able to:

CC- IX B.1: learn basics of data structure and algorithm complexities;

CC- IX B.2: implement arrays and various searching, sorting techniques;

CC- IX B.3: understand the idea of implementation for stack, linked list and queue;

CC- IX B.4: learn tree traversal methods and graphs;

CO-PO Mapping Matrix for Course Code: CC – IX B											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- IX B.1	3	3	2	3	3	2	2	2	2	3	2
CC- IX B.2	3	2	3	3	3	2	2	2	2	2	2
CC- IX B.3	2	3	3	3	2	2	2	2	1	1	2
CC- IX B.4	3	2	2	2	3	3	2	3	3	2	2
Average	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2

CO-PSO Mapping Matrix for Course Code: CC – IX B			
COs	PSO1	PSO2	PSO3
CC- IX B.1	2	2	3
CC- IX B.2	2	3	3
CC- IX B.3	2	3	3
CC- IX B.4	2	2	3
Average	2	2.5	3

UNIT – I

Data Structure Definition, Data Type vs. Data Structure, Categories of Data Structures, Data Structure Operations, Applications of Data Structures, Algorithms Complexity and Time-Space Trade-off, Big-O Notation. Strings: Introduction, Strings, String Operations, Pattern Matching Algorithms.

UNIT – II

Arrays: Introduction, Linear Arrays, Representation of Linear Array in Memory, Traversal, Insertions, Deletion in an Array, Multidimensional Arrays, Sparse Matrix. Algorithm for Insertion, Deletion Addition and Multiplication in 2-D Array. Searching and Sorting Techniques, Sorting Techniques: Bubble Sort, Merge Sort, Selection Sort, Heap Sort, Insertion Sort. Searching Techniques: Sequential Searching, Binary Searching, Search Trees.

UNIT – III

Stacks & Queues: Representation of Stacks, Stack Operations, Applications, Queues, Operations on Queues, Circular Queues, Dequeue, Priority Queues, Applications.

Linked Lists: Introduction, Types, Operations (Insertion, Deletion, Traversal, Searching, Sorting), Applications,

Dynamic Memory Management, Implementation of Linked Representations.

UNIT – IV

Trees: Basic Terminology, Representation, Binary Trees, Tree Representations using Linked List, Basic Operation on Binary tree, Traversal of Binary Trees: In order, Pre-order & Post-order, Applications of Binary tree. Algorithm of Tree Traversal with and without Recursion. Graphs: Definitions and Basic Terminologies, Representation of Graphs, Graph Traversals, Shortest Path Problem, Applications.

Text Books:

- [1] Seymour Lipschutz, Data Structures, Tata McGraw-Hill Publishing Company Limited, Schaum's Outlines.
- [2] YedidyanLangsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, Data Structures Using C, Pearson Education.

Reference Books:

- [1] Trembley, J.P. And Sorenson P.G., An Introduction to Data Structures With Applications, Mcgraw-Hill.
- [2] Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Addison-Wesley.

CC- XII A: PROGRAMMING IN JAVA

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of JAVA as a High level language as one of the programming tool and generating logical development using programming. Making student to learn about OOPS and linking JAVA as a powerful OOPs language. Also making student aware of property of JAVA as Platform independent.

Course Outcomes: At the end of this course, the student will be able to:

CC- XII A.1: demonstrate the basic programming constructs of Java and OOPs to develop Java programs.

CC- XII A.2: learn and develop various controls and branching of logics under various cases using language control structures.

CC- XII A.3: exemplify the usage to implement polymorphism and Inheritance in java programs.

CC- XII A.4: acquire knowledge of Packages, Interfaces, Exceptions and Multithreading in building efficient applications.

CO-PO Mapping Matrix for Course Code: CC – XII A											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- XII A.1	3	2	3	1	3	2	2	3	2	1	2
CC- XII A.2	3	2	3	1	2	3	2	3	2	1	3
CC- XII A.3	3	2	3	1	2	2	2	3	2	--	2
CC- XII A.4	3	2	3	1	3	3	2	3	3	1	3
Average	3	2	3	1	2.5	2.5	2	3	2.25	1	2.5

CO-PSO Mapping Matrix for Course Code: CC – XII A			
COs	PSO1	PSO2	PSO3
CC- XII A.1	1	2	3
CC- XII A.2	1	3	3
CC- XII A.3	1	2	3
CC- XII A.4	1	3	3
Average	1	2.5	3

UNIT – I

Key Attributes of Object-Oriented Programming, Introduction to Java, History and Features of Java, Java Virtual Machine (JVM), JDK, Java Runtime Environment; Basic Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data types, Operators, Assignments; Input/output in Java: Basics, I/O Classes, Reading Console Input.

UNIT – II

Control Structures in Java: Decision and Loop Control Statements.

Class and Object in Java: Class Fundamentals, creation of Objects, Defining Methods, Argument Passing

Mechanism, Constructors, Abstract Class, Static Members. Array in Java: Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array.

UNIT – III

String: String Fundamentals, Operations on Array and String, String Constructors, Creating Strings using String Class and StringBuffer Class. Polymorphism in Java: Basic Concept, Types, Overriding vs Overloading, Inheritance: Benefits of Inheritance, Types of Inheritance

UNIT – IV

Interface : Implementing Interface, extending Interface; package: creating a package, import keyword; exception handling: catching multiple exception, throw/throws keyword, Finally keyword, user defined exception, Introduction to Multithreading

Text Books:

- [1] Ivor Horton, Beginning JAVA 2, WROX Publications, New Delhi
- [2] Patrick Naughton and Herbert Schlitiz, JAVA-2 Complete Reference ,TMH, New Delhi
- [3] Paul Deital & Harvey Deital, Java: How to Program, Pearson Education.

Reference Books:

- [1] Balaguruswamy, Programming with Java, TMH, New Delhi.
- [2] Java6 Programming, BlackBook, KoGenT, DreamtechPress.

CC-XII B: OPERATING SYSTEM

Type: Core Course (CC)

Course Credits: 03

Contact Hours: 03 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 60

External Pass Marks: 24

Internal Maximum Marks: 15

Total Max. Marks: 75

Total Pass Marks: 30

Instructions to paper setter for End semester examination:

Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide knowledge of Operating System (OS) as a system program. Making student to learn about OS and linking OS as a powerful tool to make system work. Student will be able to learn types of OS and learn about system operations using OS.

Course Outcomes: At the end of this course, the student will be able to:

CC-XII B.1: understand the basic concepts of operating systems and its services.

CC-XII B.2: understand concept of process management and scheduling.

CC-XII B.3: acquire knowledge of process synchronization along with deadlock handling.

CC-XII B.4: learn about memory management and distributed operating system.

CO-PO Mapping Matrix for Course Code: CC – XII B

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CC- XII B.1	3	3	2	3	3	2	2	2	2	-	2
CC- XII B.2	3	2	3	3	3	2	2	2	2	-	2
CC- XII B.3	2	3	3	3	2	2	2	2	2	1	2
CC- XII B.4	3	3	2	2	3	3	2	3	2	-	2
Average	2.75	2.75	2.5	2.75	2.75	2.25	2	2.25	2	1	2

CO-PSO Mapping Matrix for Course Code: CC – XII B

COs	PSO1	PSO2	PSO3
CC- XII B.1	2	3	2
CC- XII B.2	2	3	3
CC- XII B.3	2	3	3
CC- XII B.4	2	2	2
Average	2	2.75	2.5

UNIT – I

Introductory Concepts: Operating System Functions and Characteristics, Historical Evolution of Operating Systems, Operating System Structure and Operations;
Types of Operating System: Real time, Multiprogramming, Multiprocessing, Batch processing;
Operating System Services, Operating System Interface, Methodologies for Implementation of Operating System, Service System Calls, System Programs.

UNIT – II

Process Management: Process Concepts, Operations on Processes, Process States and Process Control Block. Inter-Process Communication;
Multithreaded Programming: Multithreading Models, Threading Issues;
CPU Scheduling: Scheduling Criteria, Levels of Scheduling, Scheduling Algorithms, Multiple Processor Scheduling; Algorithm Evaluation.

UNIT – III

Synchronization: Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classical Problem of Synchronization, Monitors, Atomic Transactions;
Deadlocks: Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock

Avoidance, Deadlock Detection and Recovery.

UNIT – IV

Memory Management Strategies: Memory Management of Single-User and Multiuser Operating System, Partitioning, Swapping, Contiguous Memory Allocation, Paging and Segmentation;

Virtual Memory Management: Demand Paging, Page Replacement Algorithms, Thrashing, Memory Mapped Files.

Distributed Operating Systems: Types of Network based Operating Systems, Network Structure, Design Issues;

Text Books:

[1] Silberschatz A., Galvin P.B.,and Gagne G., Operating System Concepts, John Wiley & Sons.

[2] Godbole, A.S., Operating Systems, Tata McGraw-Hill Publishing Company, New Delhi.

Reference Books:

[1] Deitel, H.M., Operating Systems, Addison-Wesley Publishing Company, New York.

[2] Tanenbaum, A.S., Operating System-Design and Implementation, Prentice Hall of India, New Delhi.

DSE-III (I): JAVASCRIPT

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to develop the skill & knowledge of concepts commonly used in dynamic language programming. Student will also be able to learn about client side interfaces through the use of DOM.

Course Outcomes: At the end of this course, the student will be able to:

DSE-III (I).1: understand concept of Scripting.

DSE-III (I).2: acquire knowledge about basic fundamentals of JavaScript.

DSE-III (I).3: understand the applicability of various objects like window, document used in programming.

DSE-III (I).4: acquire the skills that will enable him to design and build high level web enabled applications.

CO-PO Mapping Matrix for Course Code: DSE-III (I)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-III (I).1	3	3	2	3	1	3	2	3	2	1	2
DSE-III (I).2	3	3	3	3	1	3	2	2	2	1	2
DSE-III (I).3	3	3	3	3	2	3	2	2	2	1	2
DSE-III (I).4	3	3	3	3	2	3	2	3	2	2	3
Average	3	3	2.75	3	1.5	3	2	2.5	2	1.25	2.25

CO-PSO Mapping Matrix for Course Code: DSE-III (I)			
COs	PSO1	PSO2	PSO3
DSE-III (I).1	2	3	3
DSE-III (I).2	2	3	3
DSE-III (I).3	2	3	3
DSE-III (I).4	2	3	3
Average	2	3	3

UNIT – I

The Nature of JavaScript: Evolution of Scripting Languages, JavaScript -Definition, Programming for Non-Programmers, Introduction to Client-Side Programming, Comparison between Java, JavaScript & VB Script. Enhancing HTML Documents with JavaScript. Static and Dynamic web pages.

UNIT – II

Introduction to JavaScript: Document Object Model (DOM), obtaining user inputs, memory concepts, Character set, case sensitivity, comments, Literals, Expression & Operators, Control Structures, looping constructs, break, continue statements, variables, Data types, Keywords.

UNIT – III

JavaScript types, merge multiple JavaScript into one, Running Scripts, Methods, and Events, Introduction to Objects: String, Date, Boolean, Window, document and various Object interaction,

UNIT – IV

Array declaration and allocation, passing arrays to function, Scoping rules, Recursion and iteration, cookies, Form Validation. Introduction to XML.

Text Books:

- [1] David Flanagan, JavaScript: The Definitive Guide: The Definitive Guide.
- [2] Chris Bates, Web Programming, building Internet applications, WILEY Dreamtech.

Reference Books:

- [1] Kogent Learning, Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book, Wiley India Pvt. Ltd.

DSE-III (II): DATABASE MANAGEMENT SYSTEM

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: Today almost all real life problems include data. The objective of this paper to get student aware about the basic concept of Data. In this paper student will learn database management and its implementation.

Course Outcomes: At the end of this course, the student will be able to:

DSE-III (II).1: learn basic concepts of data base along with its functions and components.

DSE-III (II).2: understand Relational data models.

DSE-III (II).3: understand SQL as query language and Learn the concept of relational algebra and calculus.

DSE-III (II).4: acquire knowledge of advanced concepts of DBMS.

CO-PO matrix for the Course Code: DSE-III (II)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-III (II).1	3	3	2	3	3	2	2	2	3	3	2
DSE-III(II) .2	3	2	3	3	3	1	2	2	2	2	2
DSE-III(II) .3	3	3	2	2	3	3	2	3	3	2	2
DSE-III(II) .4	2	3	3	3	2	2	2	2	1	1	2
Average	3	2.75	2.5	2.75	2.75	2	1.75	2.25	2.25	2	1.5

CO-PSO Mapping Matrix for Course Code: DSE-III (II)			
COs	PSO1	PSO2	PSO3
DSE-III (II).1	3	3	2
DSE-III(II) .2	2	3	3
DSE-III(II) .3	1	3	3
DSE-III(II) .4	1	3	3
Average	1.75	3	2.75

UNIT – I

Basic Concepts: File Systems vs. DBMS, Characteristics of Database Approach, Abstraction and Data Integration, Database users, Advantages and Disadvantages of DBMS.

Database Systems Architecture: Data Models, Schema and Instances, DBMS architecture and Data Independence, Database languages and Interfaces, DBMS functions.

Entity Relationship Model: Entity Types, Entity Sets, Attributes & keys, Relationships Types & instances, Roles and Structural Constraints, E-R Diagrams

UNIT – II

Relational Data Model: Basic Concepts, Integrity Constraints over Relations, Relational Algebra: Basic Operations. Relational Database Design: Functional Dependencies, Decomposition, Normal forms based on primary keys- (1NF, 2NF, 3NF, BCNF), Multi-valued Dependencies, 4 NF, Join dependencies, 5 NF, Domain Key Normal form.

UNIT – III

SQL: Meaning, Purpose and Need of SQL, Data Types, SQL Components: DDL, DML, DCL and DQL, Basic Queries, Join Operations and Sub-queries, Views, Specifying Indexes. Constraints and its Implementation in SQL.
Relational Algebra: Basic Operations: Select, Project, Join, Union, Intersection, Difference, and Cartesian Product etc.
Relational Calculus: Tuple Relational and Domain Relational Calculus. Relational Algebra Vs. Relational Calculus.

UNIT – IV

Transaction Processing Concepts: Introduction to Transaction Processing, Transaction & System Concepts, Properties of Transaction, Schedules and Recoverability
Concurrency Control Techniques: Locking Techniques, Timestamp ordering, Multi-version Techniques, Optimistic Techniques, Granularity of Data items.
Recovery Techniques: Recovery concepts, Recovery Techniques in centralized DBMS.

Text Books:

- [1] Elmasri & Navathe: Fundamentals of Database systems, Pearson Education.
- [2] Thomas Connolly Carolyn Begg: Database Systems, Pearson Education.

Reference Books:

- [1] Korth & Silberschatz: Database System Concept, McGraw Hill International Edition.
- [2] Raghu Ramakrishnan & Johannes Gehrke: Database Management Systems, Mcgraw Hill.
- [3] Ivan Bayross: SQL, PL/SQL- The Program Language of ORACLE, BPB Publication.

DSE-III (III): SOFTWARE ENGINEERING

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The objective of this course is to educate the students about the different models of software development and metrics used in software engineering.

Course Outcomes: At the end of this course, the student will be able to:

DSE-III(III).1: understand concept of Software Engineering and various SDLC;

DSE-III(III).2: learn to calculate the cost of a software project for an Enterprise;

DSE-III(III).3: gather basic information of an enterprise to design a software;

DSE-III(III).4: understand the fundamentals of Software Testing and Software Maintenance;

CO-PO matrix for Course Code: DSE-III (III)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-III(III).1	3	3	2	3	3	2	2	2	2	3	2
DSE-III(III).2	3	2	3	3	3	2	2	2	2	2	2
DSE-III(III).3	2	3	3	3	2	2	2	2	1	1	2
DSE-III(III).4	2	3	3	3	2	2	2	2	1	1	2
Average	2.5	2.75	2.75	3	2.5	2	2	2	1.5	1.75	2

CO-PSO Mapping Matrix for Course Code: DSE-III (III)			
COs	PSO1	PSO2	PSO3
DSE-III(III).1	3	2	2
DSE-III(III).2	3	2	2
DSE-III(III).3	3	2	2
DSE-III(III).4	3	2	2
Average	3	2	2

UNIT – I

Introduction to Software Engineering, System Engineering Vs Software Engineering, Software Evolution, Software Characteristics, Components, Crisis-Problems and Causes, Software Feasibility, Software Process Models – V-Model, Waterfall, Iterative Enhancement, Incremental, RAD, Prototyping, Spiral, Concurrent Development, Rational Unified Process & AGILE. Challenges in Software Engineering.

UNIT – II

Software Project Management – Planning, Scope Management, Cost Estimation – LOC, Function Point Analysis & COCOMO, Putnam Resource Allocation Model, Project Scheduling & Resource Management Gantt-Chart, PERT & CPM, Histogram, Team Building and Organization Charts, Project Monitoring & Risk Management, Software Configuration Management, Software Quality Assurance, Project Monitoring & Techniques.

Software Requirement Analysis - Structured Analysis, Object Oriented Analysis and Data Modelling, Software

Requirement Specification, DFDs, Data Dictionaries, Decision Trees, Decision Tables & Structured English, ER Diagrams.

UNIT – III

Design and Implementation of Software – Basic Fundamentals, Design Methodology (Structured and Object Oriented), Design Approaches, User Interface Designing Tools & Techniques, Design Complexity, Monitoring and Control, Coding, Halstead's Software Science, McCabe's Cyclomatic Complexity
Software Reliability: Metric and Specification, Fault Avoidance and Tolerance, Exception Handling, Defensive Programming, Component Based Development.

UNIT – IV

Software Testing – Fundamentals, Validation & Verification, White-Box and Black-Box Testing Techniques (Control Flow, Data Flow, Loop, Mutation, Load, Stress, Performance, Boundary Value, Equivalence Class, Decision Table, Cause Effect Graph Testing) Testing Strategies: Unit, Integration, Validation and System Testing, Alpha & Beta Testing, Debugging, Static Testing Strategies.
Software & Maintenance: Maintenance Characteristics, Maintainability, Maintenance Tasks and Side Effects.

Text Books:

- [1] Pressman S. Roger, Software Engineering, Tata McGraw Hill.
- [2] Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publ. House.

Reference Books:

- [1] K. K. Aggarwal, Yogesh Singh, Software Engineering, New Age International.
- [2] Sommerville, Software Engineering, Pearson Education.
- [3] Fairley Richard, Software Engineering Concepts, Tata Mc-Graw Hill Ed.
- [4] Rajib Mall, Fundamentals of Software Engineering, PHI Learning.

SEC-III (I): DATA WAREHOUSING & DATA MINING

Type: Skill Enhancement Course **Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

(SEC)

Course Credits: 02

Contact Hours: 02 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 40

External Pass Marks: 16

Internal Maximum Marks: 10

Total Max. Marks: 50

Total Pass Marks: 20

Course Objectives: The aim of the course is to understand the classical models in data warehouses and data mining.

Course Outcomes: At the end of this course, the student will be able to:

SEC-III (I).1: understand the concept of OLTP system.

SEC-III (I).2: acquire the knowledge of various tools and methodology of data warehouse.

SEC-III (I).3: learn the basic fundamentals of data mining.

SEC-III (I).4: learn pre-process the data for mining applications.

CO-PO matrix for Course Code: SEC-III (I)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC-III (I).1	3	2	3	2	2	1	1	2	1	1	2
SEC-III (I).2	3	2	3	2	3	3	2	2	2	1	3
SEC-III (I).3	3	2	3	2	2	2	2	2	2	1	2
SEC-III (I).4	3	3	3	2	3	3	2	2	2	1	3
Average	3	2.25	3	2	2.5	2.25	1.75	2	1.75	1	2.5

CO-PSO Mapping Matrix for Course Code: SEC-III (I)			
COs	PSO1	PSO2	PSO3
SEC-III (I).1	2	1	1
SEC-III (I).2	3	3	1
SEC-III (I).3	2	1	1
SEC-III (I).4	2	2	1
Average	2.25	1.75	1

UNIT – I

Introduction to Data Warehouse: OLTP Systems, Differences between OLTP Systems and Data Warehouse, Characteristics of Data Warehouse, Functionality of Data Warehouse, Advantages and Applications of Data Warehouse.

UNIT – II

Top- Down and Bottom-Up Development Methodology, Tools for Data warehouse development, Data Warehouse Types, Data Warehouse Architecture, and Components of Data Warehouse Architecture, Introduction to Federated Data Warehouse Architecture.

UNIT – III

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

UNIT – IV

Data Preprocessing: Introduction to Data Preprocessing, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Text Books:

- [1] Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier.

Reference Books:

- [1] Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
- [2] Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.
- [3] Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition

SEC-III (II): COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

Type: Skill Enhancement Course (SEC)
Course Credits: 02
Contact Hours: 02 hours/week.
Examination Duration: 3 Hours
Mode: Lecture
External Maximum Marks: 40
External Pass Marks: 16
Internal Maximum Marks: 10
Total Max. Marks: 50
Total Pass Marks: 20

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to have understanding of statistical and graphical techniques in Statistical applications. This course will make student knowing about the concept of fundamentals of Sampling.

Course Outcomes: At the end of this course, the student will be able to:

SEC-III (II).1: learn the concepts of algebraic methods and find solutions of polynomial equation.

SEC-III (II).2: apply numerical methods to obtain approximate solutions to mathematical problems.

SEC-III (II).3: fit curves & find correlations.

SEC-III (II).4: solve statistical problems probability distributions.

CO-PO matrix for Course Code: SEC-III (II)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC-III (II).1	3	2	2	3	2	3	2	3	2	-	1
SEC-III (II).2	3	2	2	3	2	3	2	3	2	-	1
SEC-III (II).3	3	1	2	3	2	1	2	2	2	-	1
SEC-III (II).4	3	3	2	1	2	2	2	3	2	-	1
Average	3	2	2	2.5	2	2.25	2	2.75	2	-	1

CO-PSO Mapping Matrix for Course Code: SEC-III (II)			
COs	PSO1	PSO2	PSO3
SEC-III (II).1	3	2	1
SEC-III (II).2	3	2	1
SEC-III (II).3	3	2	1
SEC-III (II).4	3	2	1
Average	3	2	1

UNIT – I

Algebraic and Transcendental Equation: Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Methods of finding complex roots, Rate of convergence of Iterative methods, Finding solution for Polynomial Equations, Developing algorithms for these methods.

UNIT – II

Numerical Integration: Introduction, Trapezoidal rule, Simpson's 1/3 and 3/8 rule; Interpolation: Lagrange's method, Newton's method; Developing algorithms for these methods.

Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge- Kutta Methods, Predictor Corrector Methods, Automatic Error Monitoring and Stability of solution, Developing algorithms for these methods.

UNIT – III

Curve Fitting: Straight line fit, Quadratic fit, Exponential fit, Correlation: Range Correlation, Karl Pearson correlation; Regression; Developing algorithms for these methods.

UNIT – IV

Mean, Median, Mode, Variance, Standard Deviation, kurtosis, moments, skewness; Probability distribution: Binomial, Poisson, Normal distribution; Developing algorithms for these methods

Text Books:

- [1] Rajaraman V, Computer Oriented Numerical Methods, Pearson Education
- [2] S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, Khanna publications.

Reference Books:

- [1] Goon, A.M., Gupta Fundamental of Statistics., B. Press. Calcutta.
- [2] Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, Pearson Publishers.

SEC-III (III): COMPUTER NETWORKS

Type: Skill Enhancement Course (SEC)

Course Credits: 02

Contact Hours: 02 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 40

External Pass Marks: 16

Internal Maximum Marks: 10

Total Max. Marks: 50

Total Pass Marks: 20

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: Provide a comprehensive introduction to Computer Networks and its associated concepts and terminology along with the knowledge of Network architecture, design issues, and hardware components. Give exposure to the contemporary networking technologies and security issues for networks.

Course Outcomes: At the end of this course, the student will be able to:

SEC-III (III).1: understand and characterize various types of computer networks along with an overview of the standard OSI and TCP/IP reference models that illustrates the network architecture;

SEC-III (III).2: have a comprehensive understanding of data communication and basic terminology along with its hardware components.

SEC-III (III).3: conceptualize the various design issues related to data link layer.

SEC-III (III).4: get familiar with routing and security issues related to computer networks and the solutions for handling security related problems in networks;

CO-PO matrix for Course Code: SEC-III (III)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC-III (III).1	3	3	2	3	3	2	2	2	2	1	2
SEC-III (III).2	3	2	3	3	3	2	2	2	2	1	2
SEC-III (III).3	2	3	3	3	2	2	2	2	1	-	2
SEC-III (III).4	3	3	3	3	3	3	3	3	3	2	3
Average	2.75	52.7	2.75	3	2.75	2.25	2.25	2.25	2	1.25	2.25

CO-PSO matrix for Course Code: SEC-III (III)			
COs	PSO1	PSO2	PSO3
SEC-III (III).1	3	1	1
SEC-III (III).2	1	1	1
SEC-III (III).3	1	1	1
SEC-III (III).4	3	1	2
Average	2	1	1.25

UNIT – I

Introduction to Computer Networks; Goals and applications; Types of Computer Networks; Network Design Issues and Protocols; Computer Communications and Networking Models; Communication Service methods and Data Transmission Modes; OSI Reference Model; OSI Service Types; Functions of layers of OSI Model; TCP/IP architecture; Purpose of major Protocols of TCP/IP;

UNIT – II

Physical layer: Analog and Digital Communication concepts; Copper Media; Fiber-Optic Media; Wireless Communications; Satellite Communication; Speed and Capacity of a communication channel; Network Hardware Components; Multiplexing; Switching;
Dialup Networking; Analog Modem Concepts; DSL Service; Cable Modems; Leased lines; Home Networking Concepts;

UNIT – III

Data Link layer: Framing Techniques; Flow Control; Sliding Window Protocols; Error Control: Error Detection and Correction Methods; Medium Access Control: Random Access protocols; Token passing protocols; IEEE LAN Standards; Introduction to Wireless LANs;

UNIT – IV

Network layer: Routing Algorithms: Flooding; Shortest path Routing; Distance-Vector Routing; Link-State Routing; Multicast Routing; Techniques for Congestion Control;
Network Security Issues: Security Goals; Threat Assessment; Network Attacks; Encryption Methods: Symmetric and Asymmetric-Key Ciphers; Firewalls, Digital Signatures, Authentication and Access Control Methods: Digital Certificates, Smart Cards, Kerberos;

Text Books:

- [1] Michael A. Gallo, William M. Hancock, Computer Communications and Networking Technologies, CENGAGE learning.
- [2] Behrouz A Forouzan, Data Communications and Networking, Mc-Graw Hill.

Reference Books:

- [1] William Stallings, Data and Computer Communications, PHI.
- [2] Andrew S. Tanenbaum, Computer Networks, PHI.

DSE-VI (I): LINUX AND SHELL PROGRAMMING

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to enable students to identify and use UNIX/Linux commands and utilities to create and manage file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

Course Outcomes: At the end of this course, the student will be able to:

DSE-VI (I).1: understand Linux architecture;

DSE-VI (I).2: ability to use various Linux commands that are used to manipulate system operations.

DSE-VI (I).3: acquire knowledge of Linux File System;

DSE-VI (I).4: understand and make effective use of I/O and shell scripting language to solve problems.

CO-PO matrix for Course Code: DSE-VI (I)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-VI (I).1	3	3	2	2	3	2	2	2	3	-	2
DSE-VI (I).2	3	2	3	2	3	2	2	2	3	-	2
DSE-VI (I).3	3	3	3	2	2	2	2	2	3	-	1
DSE-VI (I).4	3	2	2	3	3	3	3	3	2	-	2
Average	3	2.5	2.5	2.25	2.75	2.25	2.25	2.25	2.75	-	1.75

CO-PSO Mapping Matrix for Course Code: DSE-VI (I)			
COs	PSO1	PSO2	PSO3
DSE-VI (I).1	3	1	1
DSE-VI (I).2	3	1	1
DSE-VI (I).3	3	1	1
DSE-VI (I).4	3	1	1
Average	3	1	1

UNIT – I

Introduction to Linux: Linux distributions, Overview of Linux operating system, Linux architecture, Features of Linux, Accessing Linux system, Starting and shutting down system, Logging in and Logging out, Comparison of Linux with other operating systems.

UNIT – II

Commands in Linux: General-Purpose commands, File oriented commands, directory oriented commands, Communication-oriented commands, process oriented commands, etc. Regular expressions & Filters in Linux: Simple filters viz. more, wc, diff, sort, uniq, grep; Introducing regular expressions

UNIT – III

Linux file system: Linux files, inodes and structure and file system, file system components, standard file system, file system types. Processes in Linux: starting and stopping processes, initialization processes, mechanism of process creation, Job control in Linux using at, batch, cron & time

UNIT – IV

Shell Programming: vi editor, shell variables, I/O in shell, control structures, loops, subprograms, creating & executing shell scripts in Linux.

Text Books:

- [1] Yashwant Kanetkar, UNIX & Shell programming – BPB.
- [2] M.G.Venkateshmurthy, Introduction to UNIX & Shell Programming, Pearson Education.
- [3] Richard Petersen, The Complete Reference – Linux, McGraw-Hill.

Reference Books:

- [1] Stephen Prata, Advanced UNIX – A programmer's Guide, SAMS.
- [2] Sumitabha Das, Your UNIX - The Ultimate Guide, Tata McGraw-Hill.

DSE-VI (II) : PROGRAMMING USING PYTHON

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to understand the core principles of the Python Language. This course will make student to design effective GUI applications.

Course Outcomes: At the end of this course, the student will be able to:

DSE-VI (II).1: understand the basic concepts of python programming.

DSE-VI (II).2: learn various data structure used in python programming.

DSE-VI (II).3: develop the simple programs of python using arrays and functions.

DSE-VI (II).4: illustrate the process of data file manipulations using python.

CO-PO Mapping Matrix for Course Code: DSE-VI (II)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-VI (II).1	3	3	2	3	1	3	2	3	3	1	3
DSE-VI (II).2	3	3	2	3	1	3	2	3	2	1	2
DSE-VI (II).3	3	2	3	3	2	3	2	3	2	1	3
DSE-VI (II).4	3	3	3	3	2	3	2	3	2	1	3
Average	3	2.75	2.5	3	1.5	3	2	3	2.25	1	2.75

CO-PSO Mapping Matrix for Course Code: DSE-VI (II)			
COs	PSO1	PSO2	PSO3
DSE-VI (II).1	2	3	3
DSE-VI (II).2	2	3	3
DSE-VI (II).3	2	3	3
DSE-VI (II).4	2	3	3
Average	2	3	3

UNIT – I

Introduction to Python: Python Interpreter, Python as calculator, Python shell, Indentation, identifier and keywords, literals, strings, Operators: Arithmetic, Relational, Logical, comparison, Bitwise, Assignment, Identity operator and Membership operator; Input output statement; Control statements: Branching, looping, Conditional statement, Exit function

UNIT – II

String manipulations: Subscript operator, indexing, slicing a string, other functions on strings, string module. Strings and number system: Format functions, converting strings to numbers & Vice Versa. List, Tuples, Sets, Dictionaries: Basic list operators, replacing, inserting, removing an element, searching, Sorting lists, dictionary literals, adding & removing keys, accessing & replacing values, traversing dictionaries

UNIT – III

Array in Python, Design with Functions: hiding redundancy, complexity, arguments & return values; Formal/Actual arguments, named arguments, program structure and design, Recursive functions, scope & Global statements, Importing modules, Math modules & Random modules.

UNIT – IV

Exception Handling: Exceptions, except clause, try and finally clause, user defined exceptions.

File Handling: Manipulating files & directories, OS & SYS modules, Reading, Writing text & numbers from/to file.

Graphics: Turtle module, drawing colors, shapes, digital images, image file formats.

Text Books:

- [1] Python Programming using problem solving approach by Reema Thareja, Oxford University Press.
- [2] Learning Python by Mark Lutz

Reference Books:

- [1] Introduction to Computation and Programming Using Python with application to understanding data byGuttag
John V, PHI
- [2] Introduction to Computer Science using Python by Charles Diorbach, Wiley.
- [3] Programming Python by Mark Lutz

DSE-VI (III) : VISUAL PROGRAMMING USING C#

Type: Discipline Specific Elective (DSE)

Course Credits: 04

Contact Hours: 04 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 80

External Pass Marks: 32

Internal Maximum Marks: 20

Total Max. Marks: 100

Total Pass Marks: 40

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to get expertise in visual programming and understand the functionalities of middleware platform

Course Outcomes: At the end of this course, the student will be able to:

DSE-VI (III).1: get the knowledge of the structure and model of the programming language C #.

DSE-VI (III).2: develop various applications in C # classes and objects.

DSE-VI (III).3: understand and implement object oriented features in C # programming language to solve the given problem.

DSE-VI (III).4: learn LINQ that binds the gap between relational and object-oriented approaches.

CO-PO Mapping Matrix for Course Code: DSE-VI (III)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
DSE-VI (III).1	3	2	2	3	1	2	1	2	1	1	2
DSE-VI (III).2	3	2	3	3	1	2	2	2	1	1	2
DSE-VI (III).3	3	2	3	3	1	3	2	2	1	1	2
DSE-VI (III).4	3	2	2	2	1	2	1	1	1	1	2
Average	3	2	2.5	2.75	1	2.25	1.5	1.75	1	1	2

CO-PSO Mapping Matrix for Course Code: DSE-VI (III)

COs	PSO1	PSO2	PSO3
DSE-VI (III).1	3	3	3
DSE-VI (III).2	2	3	3
DSE-VI (III).3	2	3	3
DSE-VI (III).4	1	3	3
Average	2	3	3

UNIT – I

Introduction to Object Technology: Introduction to C# Applications, creating a Simple Application in Visual C# Express, Formatting Text with Console. Write and Console, WriteLine, Operators: Arithmetic, Logical, Relational, Ternary, Unary, Bitwise and Bit Shift operator; Decision Making, Array and Strings manipulations

UNIT – II

Introduction to Classes and Objects: Classes, Objects, Methods, Properties and Instance Variables, Declaring Class with Method and Instantiating an Object of Class, declaring a Method with Parameters, set and get accessors,

Initializing Objects with Constructors, Floating-Point Numbers and Type decimal, Control Statements.

UNIT – III

Constructors, Composition, Garbage Collection and Destructors, static Class Members, Data Abstraction and Encapsulation, Object Initializers, Delegates Object-Oriented Programming: Inheritance, Polymorphism, Interfaces and Operator Overloading-Exception Handling

UNIT – IV

Graphical User Interfaces with Windows Forms: Introduction to Windows Forms, Control Properties and Layout: Labels, TextBoxes and Buttons, GroupBoxes and Panels, CheckBoxes and RadioButtons, Numeric UpDown Control, Event Handling, Multiple Document Interface (MDI), User-Defined Controls, Data access using LINQ to SQL.

Text Book:

[1] Paul Deitel & Harvey Deitel, C# 2010 for Programmers, Pearson Education.

Reference Books:

[1] Rob Miles, C# yellow Book, Cheese Edition 8.1.

[2] RB Whitaker, The C# Player's Guide.

SEC-IV(I): ARTIFICIAL INTELLIGENCE

Type: Skill Enhancement Course (SEC) **Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Credits: 02

Contact Hours: 02 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 40

External Pass Marks: 16

Internal Maximum Marks: 10

Total Max. Marks: 50

Total Pass Marks: 20

Course Objectives: The aim of this course is to help students to understand the concept of Artificial Intelligence, Knowledge Representation, Logic, NLP and Learning.

Course Outcomes: At the end of this course, the student will be able to:

SEC-IV(I).1: learn the basic concept of Artificial Intelligence (AI) and its application areas.

SEC-IV(I).2: acquire the knowledge of heuristic search and approaches for knowledge representations;

SEC-IV(I).3: understand the idea of natural language processing and predicate logic;

SEC-IV(I).4: gain the knowledge of learning techniques and expert system;

CO-PO matrix for Course Code: SEC-IV(I)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC- IV(I).1	3	3	2	2	3	2	2	2	3	3	2
SEC- IV(I).2	3	2	3	2	3	2	2	2	3	2	2
SEC- IV(I).3	3	3	3	2	2	2	2	2	3	1	1
SEC- IV(I).4	3	2	2	3	3	3	3	3	2	2	2
Average	3	2.5	2.5	2.25	2.75	2.25	2.25	2.25	2.75	2	1.75

CO-PSO matrix for Course Code: SEC-IV(I)			
COs	PSO1	PSO2	PSO3
SEC- IV(I).1	3	3	1
SEC- IV(I).2	2	3	--
SEC- IV(I).3	1	2	--
SEC- IV(I).4	2	2	1
Average	2	2.5	1

UNIT-I

Introduction to Artificial Intelligence (AI), Importance of AI, AI and its Related Field, AI Techniques, Criteria for success. Problem Space and Search: Problem as a State Space Search, Production System and its Characteristics, Issues in the Design of the Search Problem.

UNIT-II

Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint

satisfaction. Knowledge Representation: Definition and Importance of Knowledge, Knowledge Representation, Various Approaches Used in Knowledge Representation, Issues in Knowledge Representation.

UNIT-III

Using Predicate Logic: Representing Simple Facts in Logic, Representing Instances and is-a Relationship, Computable Function and Predicate, Natural Language Processing: Introduction Syntactic Processing, Semantic Processing, Discourse and Pragmatic Processing.

UNIT – IV

Learning: Introduction Learning, Rote Learning, learning by Taking Advice, learning in Problem Solving, learning from Example-Induction, Explanation Based Learning. Expert System: Introduction, Representing Using Domain Specific Knowledge, Expert System Shells.

Text Books:

[1] E. Rich and K. Knight, Artificial Intelligence, TMH.

Reference Books:

[1] D.W. Patterson, Introduction to AI and Expert Systems, PHI.

[2] Nils J Nilsson, Artificial Intelligence -A new Synthesis, Harcourt Asia Ltd.

SEC-IV(II): INFORMATION SECURITY

Type: Skill Enhancement Course (SEC)

Course Credits: 02

Contact Hours: 02 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 40

External Pass Marks: 16

Internal Maximum Marks: 10

Total Max. Marks: 50

Total Pass Marks: 20

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to provide an understanding of principal concepts, basic approaches of information security.

Course Outcomes: At the end of this course, the student will be able to:

SEC-IV (II).1: get the knowledge of the components of information security and security model.

SEC-IV (II).2: develop an understanding of various Laws in Information security.

SEC-IV (II).3: gain familiarity with risk identification and their control strategy.

SEC-IV (II).4: get the knowledge of information security policy.

CO-PO matrix for Course Code: SEC-IV(II)											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC- IV(II).1	3	2	2	2	3	2	1	2	2	1	2
SEC- IV(II).2	3	2	3	2	2	2	2	2	3	3	2
SEC- IV(II).3	3	3	3	2	2	2	2	2	2	2	1
SEC- IV(II).4	3	2	3	3	3	3	2	3	3	2	2
Average	3	2.25	2.75	2.25	2.5	2.25	1.75	2.25	2.5	2	1.75

CO-PSO matrix for Course Code: SEC-IV (II)			
COs	PSO1	PSO2	PSO3
SEC- IV(II).1	3	3	1
SEC- IV(II).2	1	2	1
SEC- IV(II).3	1	3	1
SEC- IV(II).4	1	3	1
Average	1.5	2.75	1

UNIT – I

Introduction: History of Information Security, CNSS Security Model, Components of Information Security, Approaches to Information Security and Implementation, Security Systems Development Life Cycle, Security Professionals and the Organization.

UNIT – II

The Need for Security: Introduction, Business Needs First: Threats and Attacks, Legal, Ethical, and Professional Issues in Information Security, Law and Ethics in Information Security: Relevant Laws, International Laws and Legal Bodies.

UNIT – III

Risk Management: An Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control Strategies: Selecting a Risk Control Strategy, Quantitative versus Qualitative Risk Control Practices

UNIT – IV

Planning for Security: Introduction to Information Security Planning and Governance, Information Security Policy, Standards, and Practices, Security Education, Training, and Awareness Program.

Text Book:

[1] Michael E. Whitman & Herbert J. Mattord, Principles of Information Security, Cengage Learning.

Reference Books:

[1] Steve G Watkins, An Introduction to Information Security and ISO 27001: 2013– A Pocket Guide.

SEC-IV (III): E-COMMERCE

Type: Skill Enhancement Course (SEC)

Course Credits: 02

Contact Hours: 02 hours/week.

Examination Duration: 3 Hours

Mode: Lecture

External Maximum Marks: 40

External Pass Marks: 16

Internal Maximum Marks: 10

Total Max. Marks: 50

Total Pass Marks: 20

Instructions To Paper Setter For End Semester Exam: Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The aim of the course is to make students aware of e-commerce in general and use of sites in particular. E-commerce is latest trend in modern era and this paper will help students establish relation to real life.

Course Outcomes: At the end of this course, the student will be able to:

SEC-IV (III).1: learn the main components of e-commerce and its prerequisites.

SEC-IV (III).2: understand the architecture of EDI and learn the different mode of electronic payment.

SEC-IV (III).3: learn the implementation of b2c type of e-commerce in real life applications.

SEC-IV(III).4: understand the idea of commerce over mobile phones, security prospectus and legal aspects of e-commerce.

CO-PO Mapping Matrix for Course Code: SEC- IV (III)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
SEC-IV (III).1	3	3	2	3	2	3	2	2	3	3	2
SEC-IV (III).2	3	2	3	2	3	2	2	3	2	2	3
SEC-IV (III).3	2	3	3	3	2	2	2	2	2	3	2
SEC-IV (III).4	3	2	2	2	2	3	3	3	3	2	2
Average	2.75	2.5	2.5	2.5	2.25	2.5	2.25	2.5	2.5	2.5	2.25

CO-PSO Mapping Matrix for Course Code: SEC- IV (III)

COs	PSO1	PSO2	PSO3
SEC-IV (III).1	3	2	2
SEC-IV (III).2	2	3	3
SEC-IV (III).3	3	3	2
SEC-IV (III).4	2	2	2
Average	2.5	2.5	2.25

UNIT-I

Introduction to E-Commerce: Defining E-Commerce, Traditional Commerce and E-Commerce, Main Activities of E-Commerce, Benefits of E-Commerce, Broad Goals of E-Commerce, Components of E-Commerce, Functions of E-Commerce, Process of E-Commerce, Types of E-Commerce, Role of Internet and Web in E-Commerce, Pre-requisites of E-Commerce, Scope of E-Commerce.

UNIT-II

Electronic Data Interchange (EDI): Introduction and definition of EDI, EDI layered Architecture, EDI technology and standards, EDI communications and transactions, Benefits and applications of EDI.

Electronic Payment Systems: Electronic Funds Transfer. Digital Token Based E-Payment Systems, Modern Payment Systems, Steps for Electronic Payment, Payment Security, Net Banking credit/debit/smart cards, E-money.

UNIT-III

Products in B2C Model: Success Factors of E-brokers, Broker-based Services on-line, On-line Travel Tourism Services, Benefits and Impact of E-Commerce on Travel Industry, Deal Estate Market, Online Stock Trading and its Benefits, Online Banking and its Benefits, On-line Financial Services and their Future, E-auctions: Benefits, Implementation and impact of E-auctions.

Unit – IV

Mobile Commerce and Future of E-Commerce: Introduction to Mobile Commerce, Benefits of Mobile Commerce, Impediments of M-Commerce, M-Commerce framework. Internet Security Issues, E-Business Risk Management Issues, Legal, Ethical and other public policy issues related to E-commerce, Emerging and future trends of E-commerce.

Text Books:

- [1] Ravi Kalakota, Andrew B. Whinston: Frontiers of Electronic Commerce, Addison Wesley.
- [2] Turban E., Lee J., King D. and Chung H.M, Electronic Commerce-A Managerial Perspective, Prentice-Hall International, Inc.

Reference Books:

- [1] K.K.Bajaj & D.Nag, E-Commerce, Tata McGraw Hill, New Delhi.
- [2] Bhatia V., E-commerce, Khanna Book Pub. Co. (P) Ltd., Delhi.

CO-PO-PSO MAPPING MATRIX FOR ALL THE COURSES OF:

Three Year B.Sc. Programme (Course Computer Science)

SEMESTER	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
I	CC – III A	3	2.5	2.5	3	3	2	2	2	2	2.5	2	2.5	3	2.5
	CC – III B	3	1.75	1.75	1	1	2	1	2	1.5	1	1.3	2	2.5	2.5
II	CC – VI A	2.75	2.5	2.5	2.75	2.75	2.25	2.25	2.25	2	2	1.75	2.5	2.75	2.5
	CC – VI B	2.75	2.5	2.5	2.75	2.25	2.25	2.25	2.5	2	1.5	2.25	2	1.5	1.25
III	CC- IX A	3	2.25	2.5	2.75	2.5	2.25	2.25	2.25	2	2	2	2.5	2.75	2.5
	CC – IX B	2.75	2.5	2.5	2.75	2.75	2.25	2	2.25	2	2	2	2	2.5	3
IV	CC – XII A	3	2	3	1	2.5	2.5	2	3	2.25	1	2.5	1	2.5	3
	CC – XII B	2.75	2.75	2.5	2.75	2.75	2.25	2	2.25	2	1	2	2	2.75	2.5
V	DSE-III (I)	3	3	2.75	3	1.5	3	2	2.5	2	1.25	2.25	2	3	3
	DSE-III (II)	3	2.75	2.5	2.75	2.75	2	1.75	2.25	2.25	2	1.5	1.75	3	2.75
	DSE-III (III)	2.5	2.75	2.75	3	2.5	2	2	2	1.5	1.75	2	3	2	2
	SEC-III (I)	3	2.25	3	2	2.5	2.25	1.75	2	1.75	1	2.5	2.25	1.75	1
	SEC-III (II)	3	2	2	2.5	2	2.25	2	2.75	2	-	1	3	2	1
	SEC-III (III)	2.75	2.75	2.75	3	2.75	2.25	2.25	2.25	2.25	2	1.25	2.25	2	1
VI	DSE-VI (I)	3	2.5	2.5	2.25	2.75	2.25	2.25	2.25	2.75	-	1.75	3	1	1
	DSE-VI (II)	3	2.75	2.5	3	1.5	3	2	3	2.25	1	2.75	2	3	3
	DSE-VI (III)	3	2	2.5	2.75	1	2.25	1.5	1.75	1	1	2	2	3	3
	SEC-IV(I)	3	2.5	2.5	2.25	2.75	2.25	2.25	2.25	2.75	2	1.75	2	2.5	1
	SEC-IV(II)	3	2.25	2.75	2.25	2.5	2.25	1.75	2.25	2.5	2	1.75	1.5	2.75	1
	SEC-IV (III)	2.75	2.5	2.5	2.5	2.25	2.5	2.25	2.5	2.5	2.5	2.25	2.5	2.5	2.25
I to VI	Average	2.9	2.44	2.54	2.5	2.31	2.3	1.98	2.31	2.05	1.59	1.98	2.18	2.39	2.1