A.D.M COLLEGE FOR WOMEN (AUTONOMOUS),

(Accredited With 'A' Grade By NAAC 4th Cycle)

(Affiliated to Bharathidasan University, Tiruchirappalli)

NAGAPATTINAM-611 001

PG DEPARTMENT OF COMPUTER SCIENCE

SYLLABUS

B.Sc., COMPUTER SCIENCE

Batch (2024-2027)

PG DEPARTMENT OF COMPUTER SCIENCE

B.Sc COMPUTER SCIENCE COURSE STRUCTURE UNDER CBCS(2021-2024 Batch)

OBE ELEMENTS

Programme Educational Objectives (PEO):

PEO 1:	To impart knowledge in advanced concepts and applications in different fields of computer Science.
PEO 2:	To prepare students to enter into professional courses.
PEO 3:	To educate students to occupy important positions in Software's, MNC's and Industries.
PEO 4:	To equip students with skills to excel in their future careers.
PEO 5:	To enable students to take up challenging jobs.

Programme Outcomes (PO):

On completion of the course the learner will be able

PO 1:	Under Graduate students are to Apply algorithmic, mathematical and scientific reasoning to a variety of computational problems
PO 2:	Undergraduate students to analyze impacts of computing on individuals organization and society.
PO 3:	Undergraduate students are recognition of the need for and ability to engage in continuing professional development.
PO 4:	Undergraduate students are to be exposed to technical, analytical and creative.
PO 5:	The Under Graduate students are recognize the social and ethical responsibilities of a professional working in the various disciplines

Programme Specific Outcomes (PSO):

On completion of the course the learner will be able

PSO 1:	To acquire knowledge with fundamentals of computer science to solve complex problems related to the field of Computer science
PSO 2:	Ability to identify, formulate and analyze complex problems related to computer science and reaching a substantiated conclusions using mathematics and its applications
PSO 3:	Ability to understand professional & ethical responsibility in the field of Computer Science.
PSO 4:	Understand the impact of the Computer professionals in societal and environmental contexts.
PSO 5:	Capability to use appropriate software for analysis of data and relevant information from various sources for easy access and evaluation in variety of learning situation.

ADM COLLEGE FOR WOMEN (AUTONOMOUS), NAGAPATTINAM

PG DEPARTMENT OF COMPUTER SCEINCE

CURRICULUM STRUCTURE – B.Sc. COMPUTER SCIENCE (2024-2027)

(For I Year 2024 Batch onwards)

Part	Category of Courses	No. of Courses	Hrs	Total Credits
Part I	Language Courses (Tamil/Hindi/French/Arabic/ Sanskrit)	4	24	12
Part II	English Language Courses	4	24	12
Part III	Core Courses (CC) (T – 10, P – 5)	15	70	60
	Minor Course (T – 4 / 5 , P – 2/1)	6	24	16
	Discipline Specific Courses (DSC)	3	10	9
	Project	1	3	3
Part IV	Skill Enhancement Courses (SEC)	4	8	8
	Ability Enhancement Courses (AEC)	3	6	6
	Multi Disciplinary Courses (NME)	2	4	4
	Environmental Studies	1	2	2
	Value Education	1	2	2
	Soft Skill Development	1	2	2
	Summer Internship/Industrial Activity	0	0	2
Part V	Gender Studies	1	1	1
	Extension Activity (NCC/NSS/Sports/Any Other Activities)	0	0	1
	Total	**46**	**180**	**140**

EXTRA CREDIT SCHEME STRUCTURE – 2024 - 2027

Courses	Credits	Semester	Marks
tra Credit Courses I(Professional English) ECPEA - ECC I - PROFESSIONAL ENGLISH FOR ARTS AND SOCIAL SCIENCES **(Tamil, English, History, Economics, Mathematics, CS, IT, BCA)** ECPEB - ECC I - PROFESSIONAL ENGLISH FOR COMMERCE AND MANAGEMENT **(Commerce & BBA)** ECPEC - ECC I - PROFESSIONAL ENGLISH FOR LIFE SCIENCES **(Zoology, Botany, Biochemistry & Marine)** ECPED - ECC I - PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCES **(Physics, Chemistry & Geology)**	2	I	100
tra Credit Courses II (Skill Course I – Add on)	2	II	100
tra Credit Courses III(Skill Course II- Add on)	2	III	100
tra Credit Courses IV(Skill Course III- Add on)	2	IV	100
lue added course I (Multidisciplinary)	2	V	100
lue added Course II (Same disciplinary)	2	VI	100
Total	**12**		

B.Sc., Computer Science
2024- 2027 Batch
SCHEME OF THE PROGRAMME

SEMESTER – I							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part I	Language Course I	LC I – Pothu Tamil I	6	3	3	25	75
Part II	English Course I	ELC I – General English I	6	3	3	25	75
Part III	Core Course I	CC I - C Programming	5	4	3	25	75
	Core Practical I	CP I - C Programming Lab	3	3	3	40	60
	First Minor Course I	FMC I - Mathematics I	4	3	3	25	75
	First Minor Course II	FMC II - Mathematics II	2	-	-	-	-
	Skill Enhancement Course I	SEC I - Computation Skills Lab	2	2	3	40	60
Part IV	VE	Value Education	2	2	3	25	75
*Extra Credit1	Extra Credit I	Extra Credit Course I – Professional English	-	2	-	0	100
		No.of.Courses -	**30**	**20+2**			
SEMESTER – II							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part I	Language Course II	LC II - Pothu Tamil II	6	3	3	25	75
Part II	English Course II	ELC II - General English II	6	3	3	25	75
Part III	Core Course II	CC II - Data Structures using C++	5	4	3	25	75
	Core Practical II	CP II -Data Structures using C++ Lab	3	3	3	40	60
	First Minor Course II	FMC II - Mathematics II	2	2	3	25	75
	First Minor Course III	FMC III - Mathematics III	4	3	3	25	75
Part IV	Skill Enhancement Course II	SEC II -Internet Lab	2	2	3	40	60
	EVS	Environmental Studies	2	2	3	25	75
*Extra CreditII	Extra Credit II	Extra Credit Course II (Skill CourseI –Add on) **Data Entry Operator with DTP**	-	2	-	0	100
		No.of.Courses-	**30**	**22+2**			

SEMESTER – III							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part I	Language Course III	LC III - Pothu Tamil III	6	3	3	25	75
Part II	English Course III	ELC III - General English III	6	3	3	25	75
Part III	Core Course III	CC III - Java Programming	5	4	3	25	75
	Core Practical III	CP III -Java Programming Lab	3	2	3	40	60
	Second Minor Course I	SMC I -Physics I	4	3	3	25	75
	Second Minor Practical I	SMP I- Physics II Lab	2	-	-	-	-
Part IV	Multi Disciplinary CourseI	**NME I** **1. DTP Lab** **2.** Web Designing Lab	2	2	3	40	60
	Skill Enhancement Course III	SEC III - R Programming Lab	2	2	3	40	60
*Extra Credit III	Extra Credit III	Extra Credit Courses III (Skill Course II – Add on)	-	2	-	0	100
		No.of.Courses -	**30**	**19+2**			

SEMESTER – IV							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part I	Language Course IV	LC IV - Pothu Tamil IV	6	3	3	25	75
Part II	English Course IV	ELC IV - General English IV	6	3	3	25	75
Part III	Core Course IV	CC IV - DOTNet Programming	5	4	3	25	75
	Core Practical IV	CP IV - DOTNet Programming Lab	3	3	3	40	60
	Second Minor Practical I	SMP I - Physics II Lab	2	2	3	40	60
	Second Minor Course III	SMC II - Physics III	4	3	3	25	75
Part IV	Multi Disciplinary CourseII	NME II **1.Animation Lab** 2.HTML and CSS Lab	2	2	3	40	60
	Ability Enhancement Course -I	AEC I -PHP Lab	2	2	3	40	60
*Extra Credit IV	Extra Credit IV	Extra Credit Courses IV (Skill Course III – Add on) Computer Literacy Lab	-	2	-	0	100
		No.of.Courses-	**30**	**22+2**			

SEMESTER – V							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part III	Core Course V	CC V - Operating System	6	5	3	25	75
	Core Course VI	CC VI -Advanced Database Management Systems	6	5	3	25	75
	Core Course VII	CC VII - Web Technology	6	5	3	25	75
	Core Practical V	CP V -Advanced Database Management System Lab	5	4	3	40	60
	Disciplinary SpecificElective –I	DSE I - **1. Web Technology Lab** 2. Software Development Tools Lab	3	3	3	40	60
Part IV	Ability Enhancement Course -II	AEC II – GIMP Lab	2	2	3	40	60
	SSD	Soft Skill development	2	2	3	25	75
	Summer Internship/ Ind. Training	Internship	-	2	-	-	-
*Extra Credit V	Extra Credit Courses V	Value Added Course I(Multidisciplinary) Artificial Intelligence (Theory andPractical)	-	2	-	0	100
		No.of.Courses-	**30**	**28+2**			

SEMESTER – VI							
PART	**COURSE TYPE**	**COURSES**	**HOURS**	**CREDITS**	**EXAM DURATION**	**MAX. MARKS**	
						CIA	**EXT**
Part III	Core Course VIII	CC VIII - Micro Computer Architecture	5	5	3	25	75
	Core Course IX	CC IX - Python Programming	5	5	3	25	75
	Core Course X	CC X - Computer Networks	5	4	3	25	75
	Core Course XI	CC XI - Project	3	3	3	40	60
	Discipline Specific Elective –II	DSE-II **1. Python Programming Lab** 2. Internet with ASP Lab	3	3	3	40	60
	Discipline Specific Elective –III	DSE III **1.Microprocessor Lab** 2. UI/UX Design and Animation Lab using Open source Tools	4	3	3	40	60
	Skill Enhancement Course -IV	SEC IV-Data visualization tools lab	2	2	3	40	60
Part IV	Ability Enhancement Course -III	AEC III- IoT Lab	2	2	3	40	60
Part V	GS	Gender Studies	1	1	3	25	75
	Extension Activity	(NCC/NSS/SPORTS/Any other activities)	-	1	-	-	-
Extra CreditVI	Extra Credit CoursesVI	Value Added Course II (SameDisciplinary) Cyber Security	-	2	-	0	100
		No.of.Courses-	**30**	**29+2**			

Semester-I / Core Course-I(CC-I)	**C Programming**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks:25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- To obtain knowledge about the structure of the programming language C
- To develop the program writing and logical thinking skill**.**
- To impart the knowledge about pointers which is the backbone of effective memory handling
- To study the advantages of user defined data type which provides flexibility for application development
- To teach the basics of Preprocessors available with C compiler

UNIT	CONTENT	HOURS
UNIT I	FUNDAMENTALS OF PROGRAMMING: Computer Basics- Algorithms – Simple Model of a Computer – Characteristics of Computers- Problem Solving Using Computers – Flow Chart – The Working of a Computer. Introduction To C Language: Identifiers, Keywords, Constants, Variables and data types, Access Modifiers, Data Type Conversions- Operators- Conditional Controls – Loop.	15
UNIT II	ARRAYS: One Dimensional Array - Two Dimensional Array – Character Arrays and Strings. FUNCTION: Introduction - Elements of User Defined Function - Definition of Functions - Return Values and their Types – Function Calls - Function Declaration - Category of Function - Nesting of Function - Recursion - Passing Arrays to Function - Passing Strings to Function – The Scope, Visibility and Lifetime of Variables - Library functions.	15
UNIT III	STRUCTURES AND UNIONS: Defining Structure - Declaring Structure Variable - Accessing Structure Members Structure Initialization - Arrays of Structure - Arrays within Structures - Structures within Structures - Structures and Function - Union.	15
UNIT IV	POINTERS : Pointers - Declaration of Pointers - Accessing Variables through Pointers - Chain of Pointers - Pointer Expressions- Pointer Increments - Pointers with Arrays, Strings- Array of Pointers - Pointers with Functions - Pointers with Structures.	15
UNIT V	FILE MANAGEMENT IN C : Defining and Opening a File - Closing a File - Input / Output Operations on Files – Error Handling During I/O Operations - Random Access to Files - Command Line Arguments - Dynamic Memory Allocation.	15

Text Books:

1. V. Rajaraman, “Fundamentals of Computer “,Asoke k.Ghosh Publications, PHI Course Limited, 6th Ed.,New Delhi,2011. UNIT I(A)
2. E. Balagurusamy, “Programming in C”, Tata McGraw Hill, 8th Ed., New Delhi, 2016. UNIT I (B) to UNIT V.

Reference Books:

1. Byron S. Gottfried, "Programming with C", Tata McGraw Hill, 3rd Ed., New Delhi, 2010.
2. Yashvant Kanetkar, "Working with C", BPB Publication, 2nd revised edition,New Delhi, 2008.

Web-Resources:

https://www.w3schools.in/c-tutorial/ https://nptel.ac.in/courses/106104128/

Course Outcomes:

On completion of the Course, learner should be able to,

- Understand the basic terminology of algorithm, flowchart and gain awareness used in computer programming.
- Design programs involving the various concepts like decision structures, loops, functions of C language.
- Demonstrate the single, multi-dimensional arrays, String functions and user defined functions.
- Compare the structure and union of C and apply it to construct array of structures and structure function.
- Understand the dynamics of memory by the use of pointers and pointers with functions

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	M	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-I / Core Practical –I (CP-I)	**C Programming Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire/ Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To develop skills in implementing algorithms through the programming Language C
- To explore the features of C by applying sample problems.
- The students will be able to enhance their analyzing and problem solving skills
- To learn problem solving techniques.
- To teach the student to write programs in C and to solve the problems.

List of Practical's:

1.Exercise using different data types
2.Exercise using different operators
3.Exercise to implement control structures
4.Exercise using loop statements
5.Exercise using arrays
6.Exercise to explore built-in functions
7.Exercise to create user defined function
8.Exercise using structures
9. Exercise using pointers
10. Exercise to work with files

Course Outcomes

On completion of the course the learner will be able to

- Understanding a functional hierarchical code organization.
- Ability to define and manage data based on problem subject domain.
- Ability to work with textual information, characters and strings.
- Ability to work with arrays of complex objects.
- Understanding a concept within the framework of functional model.

Semester-I / Skill Enhancement Course -I (SEC I)	Computation Skills Lab	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Office tools course would enable the students in crafting professional word documents, excelspread sheets, power point presentations using the Microsoft suite of office tools.
- Give students an in-depth understanding of why computers are essential components in business,education and society.
- Provide foundational or "computer literacy" curriculum that prepares students for life-long learning of computer concepts and skills.
- To acquire knowledge on editor, spread sheet and presentation software.
- To train them to work on the comment based activities in MS-office system

List of Practical's:

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Picture Insertion and Alignment
5. Mail Merge Concept
6. Copying Text and Picture
7. Creation of Tables, Formatting Tables
8. Splitting the Screen

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning, Editing Data in Cell
3. Date and Time Function
4. Mathematical Functions
5. Moving, copying, Inserting and Deleting Rows and Columns

6. Drawing Borders Around Cells
7. Creation of Charts and Changing Chart Type

MS -POWER POINT

Working With Slides

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clip art: working with clipart
6. Applying Transition and animation effects
7. Run and Slide Show

Course Outcomes:

On completion of the Course, learner should be able to

- To perform documentation activities
- To execute accounting operations
- To enhance presentation skills
- To work on Document Management Systems
- Format Text, Paragraphs, and sections, and to create and manage documents

Semester-I / VE	**Value Education**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- To understand the philosophy of life and values through Thirukural
- To analyse the components of values education to attain the sense of citizenship
- To understand different types of values towards National Integration and international understanding
- To learn yoga as value education to promote mental and emotional health
- To understand human rights, women rights and other rights to promote peace and harmony

UNIT	CONTENT	HOURS
UNIT I	PHILOSOPHY OF LIFE AND SOCIAL VALUES: Human Life on Earth (Kural 629) -Purpose of Life (Kural 46) -Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).	6
UNIT II	HUMAN VALUES AND CITIZENSHIP : Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building.	6
UNIT III	VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT: Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and	6

	faith -Religious Values: Tolerance, wisdom, character - Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.	
UNIT IV	YOGA AND HEALTH: Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.	6
UNIT V	HUMAN RIGHTS: Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty ad Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.	6

Text Books:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004.
2. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
3. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
4. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.

Reference Books:

1. Grose. D. N – "A text book of Value Education' New Delhi (2005)
2. Gawande . EN – "Value Oriented Education" – Vision for better living. New Delhi (2002) Saruptsons
3. Brain Trust Aliyar- "Value Education for Health, Happiness and Harmony" Erode (2004) Vethathiri publications

Web Resources:

https://www.studocu.com/in/document/thiruvalluvar-university/bcom-general/value-education-study-material-1/24751487
https://www.dypiemr.ac.in/images/value-added-courses/vac/Content-for-Value-Education.pdf
https://mrcet.com/downloads/digital_notes/CSE/Mtech/I%20Year/Value%20education%20Digital%20notes.pdf

Semester-II/ Core Course – II (CC II)	**Data Structures Using C++**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- To give the concepts of object oriented programming and to impart the programming skills inC++.
- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand dynamic memory management techniques
- Classify inheritance with the understanding of early and late binding, usage of exceptionhandling, generic programming.
- Demonstrate the use of various OOPS concepts with the help of programs

UNIT	CONTENT	HOURS
UNIT I	Object Oriented Programming Paradigm - Basic Concepts and Benefits of OOP – Object Oriented Language - Application of OOP - Structure of C++ - Applications of C++ - Function Prototyping - Call by Reference - Return by Reference - Inline Functions – Default Arguments - Constructor Arguments- Function Overloading - Friend and Virtual Functions - Classes and Objects- Member Functions - Nesting of Member Functions – Private Member Functions - Memory Allocation of Objects - Static Data Members –Static Member Functions - Arrays of Objects – Objects as Function Arguments	15
UNIT II	CONSTRUCTORS& INHERITANCE Parameterized Constructors – Multiple Constructors - Constructor with Default Parameters - Copy and Dynamic Constructors -Destructors - Operator Overloading – Defining Derived Classes - Single Inheritance - Multiple Inheritance – Hybrid Inheritance -Virtual Base Class - Abstract classes - Constructors In Derived Class -Member Classes - Nesting of Classes.	15
UNIT III	LINEAR DATA STRUCTURES: Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists –Polynomial Manipulation - Stack ADT – Queue ADT - Evaluating arithmetic expressions.	15
UNIT IV	NON-LINEAR DATA STRUCTURES: Trees – Binary Trees – Binary tree representation and traversals – Application of trees: Set representation and Union-Find operations – Graph and its representations – Graph	15

	Traversals – Representation of Graphs – Breadth-first search – Depth- first search - Connected components. SORTING and SEARCHING: Sorting algorithms: Insertion sort - Quick sort - Merge sort - Searching: Linear search –Binary Search.	
UNIT V	History of Bioinformatics – Goal of bioinformatics as a separate discipline – Emerging branches of Bioinformatics- NCBI PubMed- Genbank, Fasta and Swiss-Prot formats – Sequence Databases : Nucleotide Sequence – Protein Sequence Databases – SWISS-PROT, Protein Structure Visualization Tools: RasMol, Swiss PDB Viewer- Database searching tools– BLAST and FASTA algorithms – Various versions of basic BLAST and FASTA.	15

Text Books:

1. E. Balagurusamy, "Object Oriented Programming with C++", TMG, 8th Ed., New Delhi, 2017.
2. Seymour Lipschutz, "DataStructures", Tata McGrawHill Publishing Company Limited, Revised 5th edition, New Delhi, 2014. UNITS: III, IV & V.

Reference Books:

1. Robert Lafore, "Object Oriented Programming in Microsoft C++", Galgotia Publications,4th edition, New Delhi, 2000.
2. Bjarne Stroustrup, "The C++ Programming Language", Addison- Wesley, 4th edition., 2013

Web-Resources:

https://www.w3schools.com/**cpp**/ http://nptelvideos.com/video.php?id=2187&c=28

Course Outcomes:

On completion of the Course, learner should be able to

- Learn the basic concepts in Object-Oriented programming.
- Develop programming skills by applying Object-Oriented programming.
- Discuss the function overloading and Member Functions.
- Understand the concepts of Constructors and Inheritance.
- An Ability to incorporate Exception Handling in Object-Oriented programs and analyze File Input/output Streams.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-II / Core Practical II (CP II)	**Data Structures Using C++ Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To understand the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand how to produce object-oriented software using C++
- To familiarize the students with language environment.
- To implement various concepts related to language.
- Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.

List of Practicals:

1. Program to find factorial of a given number.
2. Program to illustrate the call by value and call by reference
    a) Program to find the largest of three numbers using inline function.
    b) Program to find mean of 'N' numbers using friend function.
3. Program to find volume of cube, cylinder and rectangular box using function overloading.
4. Matrix Addition and Multiplication operations
5. To find an element using Sequential and binary search.
6. Perform the following types of Sorting: i. Bubble sort ii. Insertion sort iii. Selection sort
7. To PUSH and POP an element from STACK.
8. To Insert and Delete an element from QUEUE.
9. To insert and delete a node in a linked list.
10. Explore the sitemap of NCBI and PUBMED and find the official gene symbol, alias name, chromosome number and ID for a particular sequence.
11. Retrieve the Genbank entry with an accession number AF375082 and save the sequence in FASTA format.
12. Retrieve Protein sequences from Protein Data Bank (PDB)and analyze the primary, secondary and tertiary protein structure using tools
13. Retrieve nucleotide sequences and perform local alignment and global alignment using EMBOSS

Course Outcomes:

On completion of the Course, learner should be able to

- After the completion of this course, the students will be able to develop applications.
- Introduces Object Oriented Programming concepts using the C++ language
- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Evaluate the I/O Introduces exception handling.
- Understand dynamic memory management techniques using pointers, constructors, destructors, etc

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-II / Skill Enhancement Course (SEC II)	**Internet Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Evaluate e-mail software
- Find the Web-based e-mail services
- Use search engines and directories effectively
- Find, evaluate, and use online information resources
- Create HTML documents and enhance them with browser extensions

List of Practicals:

1. E-Mail Creation
2. Using Search Engines
3. E-Pay
4. Online Shopping
5. Submitting Forms Online
6. Online converter (pdf, word, image, etc.,)
7. Design a Web site on your college.

Course Outcomes:

On completion of the Course, the learner will be able to

- Students in both the traditional and Internet classes should use Email within Web to communicate with the instructor.
- List important consumer concerns regarding purchasing items online
- To learn to purchase through online shopping
- To learn online conversion pages.
- To learn to submit online applications

Semester-II	**Environmental Studies**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level
K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- To develop a world population that is aware of and concerned about the environment andits associated problems
- To develop the knowledge
- To ensure the Skills and attitudes
- To develop motivations
- Develop commitment to work individually and collectively towards solutions of currentproblems and prevention .

UNIT	CONTENT	HOURS
UNIT I	The Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness.	8
UNIT II	Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
UNIT III	Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers Energy flow in the ecosystem Ecological succession. Food chains, food webs and ecological pyramids Introduction, types, characteristic features, structure and function of the following ecosystem:- a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)	8

UNIT IV	Biodiversity and its conservation Introduction – Definition : Genetic, species and ecosystem diversity Bio geographical classification of India Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels India as a mega-diversity nation Hot-spots of biodiversity Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	8
UNIT V	Environmental Pollution Definition Causes, effects and control measures of: a. Air Pollution b. Water Pollution c. Soil Pollution d. Marine Pollution e. Noise pollution f. Thermal Pollution g. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution Pollution case studies Disaster management: floods, earthquake, cyclone and landslides. Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety	8
UNIT VI	Social Issues and the Environment From Unsustainable to Sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation Public awareness.	7
UNIT VII	Human Population and the Environment Population growth, variation among nations. Population explosion – Family Welfare Programmes Environment and human health Human Rights - Value Education HIV/ AIDS - Women and Child Welfare Role of Information Technology in Environment and human health .Case studies.	8
UNIT VIII	Field Work Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain	-

Reference Books:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013,India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. CambridgeUniversity Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub.House, Delhi

12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science(TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).

Reference Books:

1. Robert Lafore, "Object Oriented Programming in Microsoft C++", Galgotia Publications,4th edition, New Delhi, 2000.
2. Bjarne Stroustrup, "The C++ Programming Language", Addison- Wesley, 4th edition., 2013

Web-Resources:

http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%20Rules,%202004.pdf.

Course Outcomes:

On completion of the Course, learner should be able to

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

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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W-Weakly Correlated
N – No Correlation

Semester-II-Extra Credit Course II(SEC-I)	**Data Entry Operator with DTP**	**Course Code:**
Instruction Hours:	**Credits: 2**	**Exam Hours:**
Internal Marks :-	**External Marks:100**	**Total Marks: Grade**

Course Objectives:

- To understand the basics of computers.
- To develop skills in computer software.
- To gain knowledge of Microsoft Office tools such as Word, Excel, and PowerPoint.
- To develop skills in typing and data entry.
- To learn to use file management software for data organization.

UNIT I: **Marks:40**

Basics of Computer
Input Devices

- Keyboard
- Mouse
- Trackball
- Scanner
- Barcode reader
- Digitizer
- OCR,MICR

Output Devices

- Monitor
- Printers
- Plotters
- Soundcard and speakers
- System Software and Application Software
- Computer Language
- Compiler and Assembler

UNIT II:

Formatting Documents

- Working with text
- Formatting Paragraphs
- Creating Bulleted and Numbered Lists
- Spelling and Grammar

UNIT III:

Formatting Worksheets

- Formatting Toolbar
- Formatting Cells
- Formatting Columns and Rows
- Protect and Unprotect Worksheets

DESKTOP PUBLISHING LAB **Marks:60**

MS-Windows

- Introduction to Computer
- Computer Basic
- Creating Folder
- Directories

PageMaker

- Page Layout, Word Wrapping
- Grouping, Merging two or more files
- Creating columns, Tab settings
- Paragraph settings, Fonts, Mixing Text & Graphics

CorelDraw

- Logo Designing, Frame Settings
- Graphical Tools, Bitmap & Shadow Effects
- Special Effects such as Perspective
- Blending, Text Settings into objects
- Alignment Setting
- Tabs, Power Line
- Power Clip
- Contour

Photoshop

- Marquee Tool
- Magnetic Tool
- Slice Tool
- Patch Tool
- CloneStamp Tool
- Gradient Tool
- Smudge Tool
- Blur Tool,
- Text Tool
- Fill, Stroke Option
- Group, Ungroup

Course Outcome:

- Identify different computer components, install and setup operating system and related software in a computer following safety precautions.
- Create, format and edit document using Word processing application software.
- Create, format, edit and develop a workbook by using Excel.
- Edit images/photos by using Paint and Office Picture Manager Application software.
- Create and customize slides for presentation by using Power Point.

Semester-III / Core Course III (CC -III)	**Java Programming**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

Programming in the Java programming language,

- Knowledge of object-oriented paradigm in the Java programming language,
- The use of Java in a variety of technologies and on different platforms.
- To Learn Why Java is useful for the design of desktop and web applications.
- To learn how to implement object oriented designs with Java.
- To identify Java language components and how they work together in applications.

UNIT	CONTENT	HOURS
UNIT I	JAVA Evolution: History - Features - Java differs from C and C++ -Java and Internet - Java and WWW - Web Browsers. Overview of Java Language: Introduction - Simple Java program - Structure- Java tokens- Statements - Java virtual Machine.	15
UNIT II	Constants -Variables- Data types - Operators and expressions -Decision making and Branching: Simple If Statement, the IF…Else statement, The Else... If ladder, The Switch Statement, The? : Operator, Decision making and looping: The While statement, the do Statement - The for Statement - Jumps in loops - labeled loops - Classes, Objects and Methods.	15
UNIT III	Arrays, Strings and Vectors – Interfaces- Multiple Inheritance – Packages: Putting classes together Multi Threaded Programming.	15
UNIT IV	Managing Errors and Exceptions – Applet Programming – Graphics programming: The Graphics class-Lines and rectangles-Circles and ellipses-Drawing arcs-Drawing polygons- Line graphs-Using Control loops in applets-Drawing Bar charts.	15
UNIT V	Various definitions of bioinformatics, history of bioinformatics, applications of bioinformatics- Types of Databases Biological databases: Primary databases – GenBank, Protein sequence databases – Swissprot,Blossu-Structural databases – PDB, Bibliographic databases:-Pubmed,Translate tool using DNA,RNA Prediction Tool..	15

Text Book:

1. E. Balaguruswamy, Programming with JAVA -A Primer, McGraw HillProfessional, 6th edition,2015.

Reference Books:

1. Herbert Schildt, Java: The CompleteReference, McGraw Hill Professional,7th edition,2017.
2. Robert Sedgewick&Kevin Wayne, Introduction to Programmingin Java, Addison Wesley,2017.

Web-Resources:

https://www.tutorialspoint.com/java/index.htm
https://www.javatpoint.com/java-tutorial

Course Outcomes:

On Completion of the course the student should be able to

- Use an integrated development environment to write
- Compile and run
- Test simple object oriented java programs.
- Read and make elementary modifications to Java programs that solve real worldproblems
- Validate input in a Java Program

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester- III / Core Practical III (CP-III)	**Java Programming Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objective:

- Understand fundamentals of programming such as variables, conditional and iterative execution,API's etc.
- Understand fundamentals of object oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write computer programs to solve specific problems.
- Be able to use the Java SDK environment to create, debug and run Java programs.
- To implement front end and back end of an application

List of Practical's:

1. Exercises using classes and objects
2. Exercises using Control Statements
3. Exercises using different Inheritance
4. Exercises using Mouse Events
5. Exercises for implementing the font class method
6. Exercises to implement Exception Handling
7. Exercises using Interfaces
8. Exercises to illustrate the Thread Priority
9. Retrieve nucleotide sequences and perform pair wise and multiple sequence alignment using BLAST tool and analyze the output.
10. Convert gene sequence into its corresponding amino acid sequence using TranslateTool
11. Convert RNA gene sequence into its corresponding amino acid sequence using RNA prediction Tool

Course Outcomes:

On completion of the Course, learner should be able to

- Implement Object Oriented programming concept using basic syntax's of control Structures, strings and function for developing skills of logic building activity.
- Identify classes, objects, members of a class and the relationships among them neededfor a finding the solution to specific problem
- Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
- Demonstrate understanding and use of different exception handling mechanisms.
- Concept of multi threading for robust faster and efficient application development.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
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N – No Correlation

Semester-III/Multi Disciplinary Course I (NME-I)	**DTP Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Demonstrate knowledge of terminology related to desktop publishing, graphics and animation, and multimedia.
- Identify and use hardware components (input and output devices) used in desktop publishing, graphics/animation and multimedia.
- Analyze the impact of desktop publishing, graphics/animation and multimedia on society.
- Model respect for intellectual property when manipulating, morphing, and editing video, graphics, sound, and text.
- Identify and use appropriate software and documentation for an identified audience to create projects in desktop publishing, graphics/animation and multimedia.

PAGEMAKER

1. To Create a new document using the PageMaker Software.
2. To Create an ID card using PageMaker Software.
3. To Create a Student Notice Board using PageMaker Software.
4. To Create a Visiting Card using PageMaker Software.
5. To Create a Brochure using PageMaker Software.

CORELDRAW

1. Create a Logo for a company using the appropriate tools.
2. Create an Invitation card using the appropriate tools.
3. Create an Business Card using the appropriate tools.
4. Make two or three different shapes or write some text and try to use the following tools in that drawing.
    - Interactive Blend tool
    - Interactive Contour tool
    - Interactive Transparency tool
    - Interactive Drop shadow tool

Course Outcomes:

On completion of the Course, learner should be able to

- Introduction to Page Maker
- Creates effective designs based on design principles.
- Print Design Basics
- Design Principles & Color Harmony
- Layout Design

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
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Semester-III/Multi Disciplinary Course I (NME I)	**Web Designing Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To understand the importance of the web as an effective medium of communication.
- To develop basic skills in analyzing the usability of a web site.
- To develop hands on experience using open source technologies such as HTML, CSS, JavaScript, PHP and MySQL.
- To implement static, dynamic and interactive web pages and web applications.
- To be able to analyze the available open source technologies and select the appropriate one based on need.

List of Practicals

1. Design a Bio-Data Form.
2. Create a Web Page With Four Frame (Picture, Table, List, Hyperlink).
3. Write a Program to show all Character Entities.
4. To Create a Web Page in HTML to Show the Block Level Elements and Text Level Elements.
5. Create your own page with your favourite hobbies.
6. A Web Page in HTML to show books in inventory in different tables using Row Span and Column Span.
7. Create a Web Page in HTML to show Admission form.
8. A Web Page in HTML to show your resume using appropriate Formatting Elements.
9. A Web Page in HTML to show all the Text, Color, Background and Font Elements.
10. Write a Program to Create a Nested List.

Course Outcomes:

On completion of the Course, learner should be able to

- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Design, develop and host a user friendly website.
- Know the usage of APIs.
- Layout management in line with current trend.

Semester-III/ Skill Enhancement Course III (SEC-III)	**R-Programming Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objective:

- Master the use of the R and R Studio interactive environment.
- Expand R by installing R packages.
- Read Structured Data into R from various sources.
- Understand the different data types in R.
- Understand the different data structures in R.

List of Practicals:

1. R Program for Vector operations.
2. Create a R- list.
3. Implement matrices addition, subtraction and Multiplication.
4. Create a Data frame.
5. Create a factor object.
6. Import data, copy data from CSV file to R.
7. Create a R program for Mean median and mode.
8. Draw Bar charts and Pie charts in R.
9. Make visual representations of data for plotting functions in R.
10. Create a R program for Regression Model.

Course Outcomes:

On completion of the Lab, learner should be able to

- Download and install R and R Studio.
- Navigate and optimize the R integrated development environment (IDE) R Studio.
- Install and load add-in packages and import external data into R for data processing and statistical analysis.
- Learn the main R data structures – vector and data frame.
- Compute basic summary statistics.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-IV / Core Course (CC - IV)	**DOTNET Programming**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

Knowledge Level
K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5Evaluate
K6-Create

Course Objectives:

- This course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C#
- Set up a programming environment for ASP.net programs.
- Configure an asp.net application.
- Creating ASP.Net applications using standard .net controls.
- Develop a data driven web application.

UNIT	CONTENT	HOURS
UNIT I	Introduction: Integrated Development Environment - IDE Components - Setting Environment Options - Building a Console application -Variable-Variable as Objects - Constants-Arrays.	15
UNIT II	Programming Fundamentals: Flow Control Statement-Writing & using procedures - Argument-Built-in Functions -The Textbox control -The List box, Checked List Box and Combo Box Controls-The Scrollbar or Track bar controls.	15
UNIT III	Working with Forms: Appearance of Forms - Loading or showing Forms - Dynamic Forms -Designing Menus - Common Dialog controls - Rich Text box Control –List view, Tree view, or Image List Controls - Handling Strings or Characters - Handling Dates or Times - Manipulating Folders or Files - Accessing Files.	15
UNIT IV	ADO .Net: The Basic Data - Access Classes-storing Data in datasets - Update Operations -Working with Typed Datasets - Data Binding - Designing Data Driven Interfaces.	15
UNIT V	Building Web Applications: Understanding HTML or DHTML- working with HTML - Cascading Style Sheets - Server Side Technologies – Controls - ASP.Net Objects - Understanding Web Services.	15

Text Book:

1. Evangelos Petroutsos, *Mastering Microsoft Visual Basic 2008,* Wiley India Edition, Wiley Reprint, 2009.
2. Mathew MacDonald, "ASP.NET: The Complete Reference", Tata McGraw Hill Ltd., New Delhi,2017.

Reference Book:

Dr. C. Muthu, "ASP.NET", Shalom InfoTech Pvt. Ltd., 2011.

Web-Resources:

http://sigc.edu/department/computerscience/studymet/AdvancedASP.NET.pdf
http://www.mentorum.nl/docs/Traindocs/dotNET_Tutorial_for_Beginners.pdf

Course Outcomes:

On completion of the Course, Students should be able to do

- Understand the fundamental concepts of .NET frame work
- Discuss the use of various web controls and rich controls
- Infer State Management techniques in asp.net web pages
- Discuss and extend data list and data grid controls
- Demonstrate the database connectivity in ASP.NET

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-IV / Core Practical (CP-IV)	**DOTNET Programming Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire/ Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To enable the students to learn the fundamental concepts of ASP.NET.
- Maintain session and controls related information for user used in multi-user web applications
- Understand the fundamentals of developing modular application by using object oriented methodologies
- Use AJAX to create partial-page updates that refresh only the parts of the Web page that have changed.
- Connecting to data sources and managing them.

List of Practical's:

1. Form Design using Various Web Controls
2. Ad Rotator
3. Calendar Control
4. Login Control
5. Validation Controls
6. Cookie Manipulation
7. State Management (using Session and Application)
8. Data Retrieval, Updating using ADO.NET (using Stored Procedure)
9. Template Creation using Data List
10. Sorting and Paging using Data Grid

Course Outcomes:
On completion of the Course, Students should be able to do

- Design forms using various web controls
- Apply rich controls and validation controls to the web page
- Illustrate cookies, session and application state in a web page Create and manipulate the data in the database using ADO.NET.
- Create a template using data list and data grid
- Build an application using XML

Semester-IV/Multi Disciplinary Course II (NME-II)	**Animation Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To Impart Practical Training in Computer Graphics and Animation related problems.
- To implement various graphics drawing algorithms, 2D-3D transformations and clipping techniques.
- Describe and evaluate the eight major classical types of animation
- Identify modern day examples for each classical animation type.
- Emphasis on creating movement and expression utilizing traditional or electronically generated image sequences.

List of Practical's:

Photoshop :

1. (i) Handling different file formats and interchanging them, changing theresolution, color, grayscales and size of the images

   (ii) Using brushes and creating multicolor real life images
2. Cropping, rotating, overlapping, superimposing, pasting photos on a page
3. Creation of a single image from selected portions of many
4. Developing a commercial brochure with background tints
5. Creating an image with multi-layers of images and texts.
6. Applying masks and filtering on images

Flash :

1. Develop an image(s) and do the following.
2. Basic Drawing and Painting
3. Working with Strokes and Fills
4. Creating Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects
5. Creating and Managing Multiple Layers
6. Converting Text into Shapes
7. Animate using motion, shape, Tweening, and actions

Course Outcomes:

On completion of the Course, learner should be able to

- Communicate ideas, believable action and emotion effectively by employing principles
- Animation and performance in all aspects of drawing.
- Integrate the concepts, principles and theories involved in the physics of animation in all aspects ofdrawing.
- Design layouts and backgrounds that incorporate principles of composition, perspective and colour, withspeed and accuracy.
- Apply various concepts associated with computer graphics to develop the animated game

Semester-IV/Multi Disciplinary Course II (NME-II)	**2.HTML and CSS Lab**	**Course Code:**
InstructionHours:2	**Credits:2**	**ExamHours:3**
InternalMarks:40	**ExternalMarks:60**	**TotalMarks:100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Structure text and image content for the web using HTML5
- Learn semantic markup new to the HTML standard
- Style a web page using Cascading Style Sheets (CSS)
- Create hyperlinks to link to other pages
- Learn the box model for basic layout

List of Practical's:

HTML

1. Usage of New Semantic Elements
2. Create Page Structure and Navigation
3. Create Form Input and Validation.
4. Create Image onto Canvas.

CSS

1. Selectors and Colors
2. Text and Drop Shadows
3. Transition-Rotating Box
4. Linear Gradient and Radial gradient.
5. 2Dand3DAnimations
6. SVG, Drag and Drop.

Course Outcomes:

On completion of the Course, learner should be able to

- Design static web pages using HTML and CSS Using internet technologies
- Create dynamic web pages using JavaScript using internet technologies and services.
- Develop JDBC programs
- Develop server-side scripts using Servlets.
- Develop server-side scripts using JSP.

Semester- IV / Ability Enhancement Course I(AEC - I)	**PHP Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-**Acquire/ Remember**	K2-**Understanding**	K3-**Apply**	K4-**Analyze**	K5-**Evaluate**	K6-**Create**

Course Objective:

- To acquire practical knowledge of the Server Side Scripting and database basics and to develop applications using PHP and MySQL.
- Learn how to take a static website and turn it into a dynamic website run from a database using PHP and MySQL.
- Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.
- Learn how databases work and how to design one, as well as how to use php MyAdmin to work with MySQL.
- Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other data sources.

List of Practical's

1. Working with PHP operators
2. Working with different types of looping statements using php
3. Working with different types of array using php
4. Working with PHP functions
5. Working with PHP forms
6. PHP form validation
7. Working with PHP math/date function
8. Executing DML and DDL commands using MySQL
9. Joining tables
10. Retrieving data from table using PHP
11. Inserting data into table using PHP
12. Create an application using PHP and MySQL.

Course Outcomes:

Students will be able to

- Learn the environment of Server Side Script.
- Compare and contrast between Client Side Script & Server Side Script.
- Learn the use of control structures and numerous native data types with their methods.
- Make Database connectivity between Front End and Back End.
- Develop Dynamic Website that can interact with different kinds of Database Languages.

Semester-IV / Extra Credit Course IV(ECC-IV)	**Computer Literacy Lab**	**Course Code:**
Instruction Hours: -	**Credits: 2**	**Exam Hours: -**
Internal Marks :-	**External Marks:100**	**Total Marks: Grade**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools.
- Give students an in-depth understanding of why computers are essential components in business, education and society.
- Provide foundational or "computer literacy" curriculum that prepares students for life-long learning of computer concepts and skills.
- Evaluate e-mail software and Web-based e-mail services
- Use search engines and directories effectively

List of Practical's:

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Picture Insertion and Alignment
5. Creation of Documents Using Templates`
6. Mail Merge Concept
7. Copying Text and Picture
8. Creation of Tables, Formatting Tables
9. Splitting the Screen

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning, Editing Data in Cell
3. Date and Time Function
4. Mathematical Functions
5. Moving, copying, Inserting and Deleting Rows and Columns

6. Drawing Borders Around Cells
7. Creation of Charts and Changing Chart Type

MS -POWER POINT

Working With Slides

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clip art: working with clipart
6. Applying Transition and animation effects
7. Run and Slide Show

Internet:

1. E-Mail Creation
2. Using Search Engines
3. E-Pay
4. Online Shopping
5. Submitting Forms Online
6. Online converter (pdf, word, image, etc.,)
7. Design a Web site on your college.
8. Prepare the invitation using Online Software.

Course Outcomes:

On completion of the Course, learner should be able to

- To perform documentation activities
- To execute accounting operations
- To enhance presentation skills
- Students in both the traditional and Internet classes should use Email within Web to communicate with the instructor.
- List important consumer concerns regarding purchasing items online

Semester-V / Core Course V (CC-V)	**Operating Systems**	**Course Code:**
Instruction Hours: 6	**Credits: 5**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- To gain the basic knowledge about the operating systems and its various schemes and services.
- Understand how Operating Systems work
- To make students able to learn different types of operating systems along with concept of systems and CPU scheduling algorithms used in operating system.
- To provide students knowledge of memory management and deadlock handling algorithms
- At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in operating system.

UNIT	CONTENT	HOURS
UNIT I	Introduction: What is an operating system?-Early history –Process concepts: Introduction- Definition of process-process states –process state transitions – The Process Control Block – Operations on processes – Suspend and Resume - Interrupt processing – Semaphore – Deadlock & Indefinite postponement.	18
UNIT II	Real Storage –Virtual Storage Organization: Introduction – Evolution of storage Organization – Virtual Storage – Virtual Storage Management: Introduction - Virtual storage management strategies- Page replacement strategies - Working sets-Demand paging –Page size.	18
UNIT III	Job & Processor Scheduling: Introduction – Scheduling Levels - Pre-emptive vs. non pre- emptive scheduling-priorities-deadline scheduling-FIFO-RR-Quantum Size-SJF-SRT-HRN. Distributed computing: Classification of sequential & parallel Architecture –Pipelining – Vector Processing - Array processor –Dataflow computers-Multiprocessing-Fault tolerance.	18
UNIT IV	UNIX - Getting started - Gaining Confidence: The Unix File System – Creating File- Indulging File Play. Listing Files & Directories – Directory Related Commands.	18
UNIT V	Shell Programming- The First Step: When to Use Shell Scripts – The First Shell Script- Interactive Shell Scripts - Shell Variables - Shell Keywords - Another Way of Assigning Values to Variables - Tips & Traps - Unchanging Variables-Wiping Out Variables - Positional parameters – Passing Command Line Arguments – Setting Values of Position Parameters – Displaying Date in Desired Format – Using Shift on Positional Parameters –	18

	Arithmetic in Shell Script – The Carriage Return – The Tab & The Backspace – Positioning The Cursor – Beep – Bold & Beautiful – The output Command – Control Instructions in Shell.	

Text Book:

1. Dietal.H.M, An introduction to operating system, Welsey publication,3rd edition , 2005.
2. Yashavant P. Kanetkar, UNIX Shell Programming, BPB Publication,4th edition, 2012.

Reference Books:

1. Abraham Silberschatz, Peter Baer Galvin Gagne, Operating system Principles, Wiley Publishers, 7th edition, 2008.
2. Archer J harries, Operating System, Tata McGraw Hill 2nd Edition, 2011.
3. DborahS.Ray, Eric.J.Ray, Unix and Linux, Pearchpit press, 4th edition, 2009.
4. Randal K. Michael, Mastering Unix shell scripting, Wiley India, 2nd Edition, 2009.

Web-Resources:

http://www.svecw.edu.in/Docs%5CCSEOSLNotes2013.pdf
https://mrcet.com/downloads/digital_notes/CSE/II%20Year/OPERATING%20SYSTEMS%20%20NOTES%20R18.pdf

Course Outcomes:

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

- Recognize the basic concepts of operating system.
- Understand the process and thread concepts.
- Distinguish the concepts of deadlocks and storage management in operating system concepts.
- Apply various file system implementation and optimization techniques using files.
- Illustrate the virtual machine and distributed system in various fields.

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	M	S	S	S

S - Strongly Correlated
M - Moderately Correlated
W-Weakly Correlated
N – No Correlation

Semester-V / Core Course VI (CC-VI)	**Advanced Database Management Systems**	**Course Code:**
Instruction Hours: 6	**Credits: 5**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / RememberK2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives

- Distinguish between data and information and Knowledge
- Distinguish between file processing system and DBMS
- Describe DBMS its advantages and disadvantages
- Describe Database users including data base administrator
- Describe data models, Schemas and instances.

UNIT	CONTENT	HOURS
UNIT I	**Introduction:** Database System Applications –Database Languages – Transaction Management – Database Architecture – Database users and Administrators - **Relational Model:** Structure of Relational Databases – Database Design – ER Model – The Entity- relationship Model – Constraints – Entity Relationship Diagrams	18
UNIT II	Relational Algebra Operations – Relational Languages: The Tuple Relational Calculus – The Domain Relational Calculus – SQL: Background – Data Definition – Basic Structure of SQL Queries– Set Operations – Aggregate Functions – Null Values – Nested Sub-Queries – Views – Modification of the Database.	18
UNIT III	Data Normalization: Pitfalls in Relational Database Design – Decomposition – Functional Dependencies – Normalization – First Normal Form – Second Normal Form – Third Normal Form – Boyce- Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments– Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators.	18
UNIT IV	Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.	18
UNIT V	Introduction of SQLite - SQLite Features- SQLite Advantage- SQLite Installation-SQLite Commands-SQLite Syntax-SQLite Data Type-SQLite Operators-SQLite Expressions	18

Text Book:

1. "Database System Concepts", Abraham Silberschatz, Henry F.Korth, .Sudarshan, TMH 6th Edition (Units - I, II,)
2. Fundamentals of Database Management Systems", Alexis Leon, Mathews Leon, Vijay Nicole Imprints Private Limited. (Unit – III)
3. "Database Systems Using Oracle" Nilesh Shah, 2nd edition, PHI.UNIT-IV: Chapters 1&11, 12, 13 & 14
1. https://www.tutorialspoint.com/sqlite/sqlite_tutorial.pdf (Unit V)

Reference Book:

Text Book of RDBMS (Relational Database Management Systerms)- By Mrs Vidya H.Bankar, Mrs DeepaShree K, Mehendale, Mrs Sujatha P. Patel

Web-Resources:

http://www.svecw.edu.in/Docs%5CITIIBTechIISemLecDBMS.pdf
http://www.kciti.edu/wp-content/uploads/2017/07/dbms_tutorial.pdf
https://it.dru.ac.th/o-bookcs/pdfs/15.pdf
https://sd.blackball.lv/library/The_Definitive_Guide_to_SQLit e_2nd_edition.pdf
https://www.bu.edu/csmet/files/2021/03/Getting-Started-with-SQLite.pdf

Course Outcomes:

On completion of the Course, learner should be able to

- Emphasize the need, role, importance and uses of databases in application development
- Design E-R modeling for a given situation and provide the foundation for development of relational database structure.
- Identify the advantages of the database approach over the file based data storage system.
- Distinguish between different models of file organizing, storing and using of data and understand the relational model and relational algebra operations.
- Normalize the relational tables applying normalization rules and apply PL/SQL procedural interfaces statement on relational tables as per requirements.

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	M	S	S	S	S	S

S - Strongly Correlated
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Semester-V / Core Course VII (CC-VII)	**Web Technology**	**Course Code:**
Instruction Hours: 6	**Credits: 5**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- Understand the fundamental concepts of web technology.
- Learn the basics of server side programming.
- Infer web services, UDDI and WSDL.
- Demonstrate the database connectivity.
- Discuss online security and payment processing mechanisms.

UNIT	CONTENT	HOURS
UNIT I	Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol – The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.	18
UNIT II	JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking – Functions – Placing text in a browser– Dialog Boxes – Form object's methods – Built in objects – user defined objects.	18
UNIT III	XML: Comparison with HTML – DTD – XML elements – Content creation –Attributes –Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces –Applications – integrating XML with other applications.	18
UNIT IV	JSP Fundamentals: Basics – Directive basics – Page directive – The tag lib directive – The include directive – JSP Standard Actions – Java Beans –Error Handling.	18
UNIT V	Sequence databases – Nucleic acid sequence databases: GenBank, EMBL, DDBJ; Protein sequence databases: Uniprot-KB: SWISS-PROT.Structure Databases: PDB, NDB, PubChem, ChemBank. Scoring matrices: basic concept of a scoring matrix, Matrices for nucleic acid and proteins sequences, PAM and BLOSUM series, matrix derivation methods and principles. Pairwise sequence alignment: Basic concepts of sequence alignment.	18

Text Books:

1. "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", Ivan Bayross, BPB Publication. UNIT I & II
2. "XML Bible", Elliotte Rusty Harold, 2nd Edition, Wrox Publication. UNIT III

Reference Books:

1. "Beginning Java Server Pages", Vivek Chopra, Sing Li, Rupert Jones, Jon Eaves, John T. Bell, Wrox Publications. UNIT IV
2. "Practical ASP", Ivan Bayross, BPB Publication. UNIT V

Web-Resources:

http://www.srmuniv.ac.in/sites/default/files/2017/CS1019-web-tech.pdf
https://www3.ntu.edu.sg/home/ehchua/programming/java/JavaServerPages.html
https://www.tutorialspoint.com/jsp/jsp_overview.htm
https://www.w3schools.com/asp/asp_introduction.asp

Course Outcomes:

On completion of the Course, Students should be able to do

- Explain the history of the internet and related internet concepts that are vital in understanding web development.
- Discuss the insights of internet programming and implement complete application over the web.
- Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
- Utilize the concepts of JavaScript and Java
- Use web application development software tools i.e. Ajax, PHP and XML etc. and identify the environments currently available on the market to design web sites.

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated

M - Moderately Correlated

W-Weakly Correlated

N – No Correlation

Semester-V/ Core Practical V **(CP-V)**	**Advanced Database Management Systems Lab**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To acquire skills in SQL statements with various constructs
- To acquire skills in PL/SQL Programming
- To practice with stored Objects, functions, procedures, trigger.
- Design different views of tables for different users and to apply embedded andnested queries.
- Design and implement a database for a given problem according to well knowndesign principles that balance data retrieval performance with data consistency.

List of Practicals:

1. Creating, modifying and dropping Tables.
2. Inserting, modifying and deleting rows.
3. Working with Decode and case.
4. Creating tables with Adding , Dropping ,disabling /enabling constraints.
5. Retrieving rows with Character functions.
6. Retrieving rows with Number and Date functions.
7. Retrieving rows with Group functions and HAVING.
8. Retrieving rows with Sub Queries.
9. PL/SQL programs with control structures.
10. PL/SQL programs with Cursors.
11. PL/SQL programs with Exception Handling.
12. PL/SQL programs with Triggers.

Course Outcomes:

On completion of the Course, learner should be able to

- Design and implement a database schema for a given problem-domain
- Normalize a database
- Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Effectively designs basic and advanced SQL queries to retrieve data from the database.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated

M - Moderately Correlated

W-Weakly Correlated

N – No Correlation

Semester-V/ Discipline Specific Elective I(DSE-I)	**1.Web Technology Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To organize vast reams of molecular biology data in an efficient manner.
- To develop tools that aid in the analysis of such data.
- To interpret the results accurately and meaningfully.
- Bioinformatics is designed for students interested in molecular biology and genetics, information technologies and computer science.
- Bio informaticists are involved in the analysis of the human genome, identification of targets for drug discovery, development of new algorithms and analysis methods, the study of structural and functional relationships, and molecular evolution.

List of Practicals:

1. Exercises using Formatting Tags.
2. Exercises to implement table tags.
3. Exercises using List Tags.
4. Exercises to implement Frames and Frame sets
5. Exercises using Cascading Style Sheets.
6. Exercises to implement image, background color and text.
7. Exercises using Radio buttons, Check boxes and List boxes.
8. Exercises to implement ADD, DELETE and UPDATE records in the table using ADO.NET.
9. Retrieve the structures of the compounds from PubChem: Xylitol, Saccharine, Aspartame
10. Perform the PHI-BLAST and PSI-BLAST for the protein sequence Q1A232. Write the top 4 E scores values and the Sequence ID until convergence.
11. Perform Pair wise alignments for the proteins Insulin from the organism's homosapiens and Musmusculus. Calculate the Percent Similarity and Identity using BLOSUM 62 and PAM 250 Compare the results.
12. Perform the protein –ligand docking using ARGUSLAB for the given receptor and ligand (select the compounds from the databases) and compare the dock score.
13. Find the super secondary structure for any protein database.

Course Outcomes:

On completion of the Course, learner should be able to

- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Design, develop and host a user friendly website.
- Know the usage of APIs.
- Layout management in line with current trend.

Semester-V/ Discipline Specific Elective I	**2.Software Development Tools Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Course Objectives:

- Introduce and provide experience in using tools for source code version management
- Familiarize students with tools for software bug tracking in order to gain experience in using such tools
- Cover in detail the full life-cycle of software development: commit code, test and submit bug reports, provide patches and patch the source code
- Introduce and use tools for builds and installers for various platforms and/or architecture
- Introduce and use tools to develop and run unit tests.

List of Practicals:

1. Introduction to source code version management tools.
2. How to create, check-in, check-out, source code from a version management tool and compare different source code versions.
3. Introduction to source code bug tracking tools.
4. How to report bugs, report feature requests, accept bug reports, browse current reports and amend them.
5. How to create patches (using the development environment), attach them to current bug reports (using the bug tracking tool), apply and verify patches, and check in the patched code (using the version management tool).
6. Introduction to build and release systems.
7. How to tag a version (using version management tool), use a build tool to create binaries for various platforms and/or architectures.
8. How to wrap up the builds and encapsulate them into installers.
9. How to develop unit tests and integrate them into the software development lifecycle.

Course Outcomes:

On completion of the Course, learner should be able to

- Use source code version management tools
- Use bug-tracking tools for application development
- Apply the full cycle of software (source code) development
- Create builds and installers for a software product
- Develop and run unit tests as part of the development cycle.

Semester-V / Ability Enhancement Course II(AEC- II)	**GIMP Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts aboutanimation.
- To offer the knowledge of creating and working with digital images .
- To manipulate them and to develop a presentation package using multimedia tools.
- To give an overall view of multimedia tools.
- To understand and differentiate text, image, video & audio.

List of Practical's:

GIMP (Photoshop Equivalent)

1. Cropping images using Lasso Tools
2. Designing Pictures using Paint Tools
3. Designing Text using Text Tools
4. Applying Layer Effects to Images and Texts

Synfig (wiki.synfig.org / Category: Tutorials) (Flash equivalent)

1. Create an animation for bouncing a ball
2. Create brushed outlines for an image
3. Build a magnifying glass
4. Develop a slide show of photos with transitions

Aptana (http://content.aptana.com/aptana/tutorials/ **)(Dreamweaver equivalent)**

1. Developing a simple webpage with images and links
2. Develop a webpage displaying the timetable of the Department
3. Design an application form for Student Admission
4. Create your own web blog for college events

Course Outcomes:

On completion of the Course, learners should be able to

- To learn and understand technical aspect of Multimedia System
- Design and implement an animation for various themes.
- Prepare multimedia advertisement.
- Develop various Multimedia Systems applicable in real time.
- To develop multimedia application and analyze the performance of the same

Semester-V /SSD	**Soft Skill Development**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

To encourage the all round development of students by

- Focusing on soft skills of team work.
- Inter-personal relationships.
- Conflict management
- Leadership quality.
- Responsibility.

UNIT	CONTENT	HOURS
UNIT I	KNOW THYSELF/UNDERSTANDING SELF Introduction to soft skills-Self discovery-Developing positive attitude – Improving perceptions – Forming values.	6 Hours
UNIT II	INTERPERSONAL SKILLS / UNDERSTANDING OTHERS Developing interpersonal relationships-Team building–Group dynamics-Networking-Improved work relationship.	6 Hours
UNIT III	COMMUNICATION SKILLS / COMMUNICATION WITH OTHERS Art of listening-Art of Reading- Art of Speaking-Art of Writing-Art of Writing E-Mail-E-Mail Etiquette.	6 Hours
UNIT IV	CORPORATE SKILLS / WORKING WITH OTHERS Developing Body Language-Practising Etiquette and Memorism –Time Management-Stress Management.	6 Hours
UNIT V	SELLING SELF/JOB HUNTING Writing Resume / CV-Interview Skills-Group Discussion-Mock Interview-Mock GD-Goal Setting- Career Planning.	6 Hours

Text Book:

1.A Book and Development Of Soft Skill Dr. K. Meena & Dr.V. Ayothi. Soft Skills-Dr. K. Alex & Chand Company.

Reference Books:

1.Developing the leader within you John C. Maxwell
2.Good to Great by Jim Collins.

Course Outcomes:

Learner will develop their social and work-life skills, as well as their personal and emotional well- being,

- Resilience, Communication.
- Emotional maturity.
- Confidence and enthusiasm for learning.
- Citizenship.
- Employability skills.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlated

M - Moderately Correlated

W-Weakly Correlated

N – No Correlation

Semester-V/ Extra Credit **Value Added Course I**	**Artificial Intelligence** **(Theory and Practical)**	**Course Code:**
Instruction Hours:	**Credits: 2**	**Exam Hours: -**
Internal Marks :-	**External Marks:100**	**Total Marks: Grade**

Course Objectives:

- Study the concepts of Artificial Intelligence.
- Learn the methods of solving problems using Artificial Intelligence.
- Learn the knowledge representation techniques, reasoning techniques and planning
- **Demonstrate knowledge and understanding of the engineering and management principles**
- Introduce the concepts of Expert Systems and machine learning.

UNIT I: **Marks: 40**

Introduction to Artificial Intelligence:

- Introduction to AI
- Intelligent Agents
- Search Methods and Knowledge Representation
- Use Cases of Artificial Intelligence
- Role of Machine Learning Engineer
- Machine Learning Tools &Packages

UNIT II
Python Data Structures

- Python Programming Fundamentals
- Conditions and Branching
- Loops
- Functions
- Python Packages
- Working with NUMPY
- Working with Pandas
- Introduction to Data Visualization
- Introduction to Matplotlib and Seaborn
- Basic Plotting with Matplotlib and Seaborn

UNIT III

Data Wrangling Techniques

- Introduction to Data pre-processing
- Importing the Dataset
- Handling Missing data
- Working with Categorical Data
- Splitting the data into Train and Test set
- Feature Scaling

Artificial Intelligence Using Python **Marks:60**

List of Practicals:

1. Write a program to implement DFS
2. Write a program to implement BFS
3. Write a Program to find the solution for travelling salesman Problem
4. Write a program to implement Simulated Annealing Algorithm
5. Write a program to Illustrate Python Functions
6. Write a program to implement 8 puzzle problem
7. Write a program to implement Towers of Hanoi problem
8. Write a program to implement Water Jug Problem
9. Write a program to implement Knap sack Problem
10. Write a Program to Implement Alpha-Beta Pruning using Python.

Course Outcomes:

Upon completing the course, students will be able to:

- Familiar with Artificial Intelligence, its foundation and principles.
- Identify appropriate AI methods to solve a given problem.
- Examine the useful search techniques, knowledge representation techniques, Inference methods; learn their advantages, disadvantages and comparison.
- Understand important concepts like Expert Systems, AI applications.
- Learn Prolog Programming to program intelligent systems.

Semester-VI / Core Course VIII (CC- VIII)	**Micro Computer Architecture**	**Course Code:**
Instruction Hours: 5	**Credits: 5**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- Discuss the basic concepts and structure of computers.
- Understand concepts of register transfer logic and arithmetic operations.
- Explain different types of addressing modes and memory organization.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.

UNIT	CONTENT	HOURS
UNIT I	Microprocessor Architecture: Intel 8085 - Instruction Cycle - Timing diagram Instruction Format - Addressing modes - Intel 8085 Instructions.	15
UNIT II	. Programming using 8085: Simple examples - 8-bit addition and subtraction - 16-bit addition - 8-bit decimal subtraction - complements of 8-bit and 16-Bit number - shifting bits - - finding largest of two numbers - finding largest and smallest in an array - sum of series of numbers - 8-bit multiplication and division.	15
UNIT III	Peripheral Devices and Their Interfacing-I: Address Space Partitioning - Memory and I/O Interfacing - Interrupts of Intel 8085 - Interfacing Devices and I/O Devices/8255-Programmable peripheral Interface.	15
UNIT IV	Peripheral Devices and Their Interfacing-II: 8253- Programmable IntervalTimer, 8259- Priority Interrupt Controller, 8279-Programmable Keyboard/Display Interface, 8251- USART, 8237/8257- Programmable DMA Controller	15
UNIT V	8086 Architecture and assembly language Programming: Basic 8086 Configuration - minimum mode and maximum mode - CPU Architecture Internal Operation – Machine language Instructions – instruction Execution timing – Assembler instruction format.	15

Text Books:

1. B. Ram, "Fundamentals of Microprocessors and Microcomputers",Dhanpat Rai Publications Pvt. Ltd., 3 rd edition,1998.Unit I : Chapter 3, 4; Unit II: Chapter 6; Unit III : Chapter 7
2. Y.C. Liu and G.A. Gibson, "Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design", Prentice Hall of India,New Delhi,2nd edition, 1986.Unit IV: Ch 2; Unit V: Ch 3.1 - 3.9, 4.1.

Reference Books:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming and Applications with the 8085/8080A", Wiley Eastern Ltd, New Delhi, 1989

Web Resource:

https://uomustansiriyah.edu.iq/media/lectures/9/9_2017_10_27!12_38_08_AM.pdf
https://www.just.edu.jo/facultiesanddepartments/facultyofengineering/departments/biomedicalengineering/documents/micro_computer_architecture.pdf

Course Outcomes:

After learning this course, the Learner would have to

- Collected knowledge on Intel 8085 architecture and its addressing modes.
- Understood and the concepts of 8-bit processors.
- Got the fundamental knowledge of 16-bit processors.
- Familiarity on interfaces and interrupts of Intel 8085.
- Known the architecture and functionalities of 8086.

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	M	S	S	S	S	S	S	S

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N – No Correlation

Semester-VI / Core Course IX CC-IX	**Python Programming**	**Course Code:**
Instruction Hours: 5	**Credits: 5**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- After learning this course, the learner would have acquired the fundamental knowledge on Python programming
- Understood the language and hence the learner becomes skillful in python programming
- Known the usage of modules and packages in python
- Familiarity with the file concept in python been skillful experimenting the concepts of OOPs with python language
- Capable of solving problems using Python

UNIT	CONTENT	HOURS
UNIT I	Python –origins – features – variable and assignment - Python basics - statement and syntax-Identifiers – Basic style guidelines – Python objects – Standard types and other built-in types-Internal types – Standard type operators – Standard type built-in functions	15
UNIT II	Numbers – Introduction to Numbers – Integers – Double precision floating point numbers - Complex numbers – Operators – Numeric type functions – Sequences: Strings, Lists andTuples – Sequences – Strings and strings operators – String built-in methods – Lists –List type Built in Methods – Tuples.	15
UNIT III	**Mapping type**: Dictionaries – Mapping type operators – Mapping type Built-in and Factory Functions - Mapping type built in methods – Conditionals and loops – if statement – else Statement – elif statement – conditional expression – while statement – for statement – break statement – continue statement – pass statement – Iterators and the iter( ) function - Files and Input/Output – File objects – File built-in functions – File built-in methods – File built-in attributes – Standard files – command line arguments.	15
UNIT IV	Functions and Functional Programming – Functions – calling functions – creating functions – passing functions – Built-in Functions: apply( ), filter( ), map() and reduce( ) - Modules – Modules and Files – Modules built-in functions -classes – class attributes – Instances.	15
UNIT V	Introduction to Biopython – Sequence objects - Sequences and Alphabets, MutableSeq objects - simple Bioinformatics application program.	15

Text Book:

1. Wesley J. Chun, Core Python Programming, Pearson Education Publication, 2012

Reference Books:

1 Wesley J. Chun, Core Python Application Programming, Pearson Education Publication, 2015.
2 Eric Matthes, Python crash course, William Pollock, 2016.
3 Zed Shaw, Learn Python the hard way, Addition Wesley, 2017.

Web – Resources:

https://www.tutorialspoint.com/python/python_data_science
http://astronomi.erciyes.edu.tr/wpcontent/uploads/astronom/pdf/OReilly%20Python%20for%20Data%20Analysis.pdf
https://tanthiamhuat.files.wordpress.com/2018/04/pythondatasciencehandbook.pdf

Course Outcomes:

On completion of the Course, the learner will be able to

- Describe the basic built-in functions and syntax of Python programming.
- Explain the mapping and file concept.
- Explain the object oriented programming concept.
- Illustrate the concepts of decision making and construct statements.
- Illustrate the usage of database and regular expression

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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Semester-VI / Core Course X (CC- X)	**Computer Networks**	**Course Code:**
Instruction Hours: 5	**Credits: 4**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives

- Describe how computer networks are organized with the concept of layered approach.
- Describe how signals are used to transfer data between nodes.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.

UNIT	CONTENT	HOURS
UNIT I	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media	15
UNIT II	Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.	15
UNIT III	Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth	15
UNIT IV	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.	15
UNIT V	Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transporet Protocols (ITP) - Network Security: Cryptography.	15

Text Book:

1. A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.

Reference Book:

1. B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017.
2. F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008.
3. D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.

4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

Web-Resources:

https://mrcet.com/downloads/digital_notes/CSE/III%20Year/COMPUTER%20NETWORKS%20NOTES.pdf
https://mrcet.com/pdf/Lab%20Manuals/IT/COMPUTER%20NETWORKS%20(R18A0518).pdf
https://kanchiuniv.ac.in/coursematerials/VINODKUMAR_COMPUTER_NETWORKS.pdf
https://www.vssut.ac.in/lecture_notes/lecture1428550521.pdf

Course Outcomes:

On completion of the Course, Students should be able to do
CO 1: Learn the basic concepts of Data Communication and different layers
CO 2: Describe the working strategies of Wireless LAN and Wireless MAN
CO 3: Differentiate the various protocols used in communication
CO 4: Differentiate the IPv4 and IPv6 Addresses
CO5: Familiarizes the basics of GSM and CDMA

Mapping of Cos with Pos & PSOs:

CO/PO	PO					PSO				
	1	2	3	4	5	1	2	3	4	5
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

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Semester-VI / Core Course XI (CC- XI)	**Project**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To provide basic knowledge of the real time projects of the IT industry. To develop mini real time software's using any platforms such as C, C++, Java, VB, Dotnet, C#, ASP.net,VB.net, Android, iOS, Linux, Python, etc.
- To Identify Project scope, Objectives and Infrastructure.
- To Develop Activity diagram and Class diagram
- To Develop Sequence diagrams and Collaboration Diagram
- To add interface to class diagram

Course Outcomes:

On completion of the Course, learners should be able to

- Able to elicit, analyze and specify software requirements. Plan a software engineering process life cycle.
- Realize design practically, using an appropriate software engineering methodology
- Analyze and translate a specification into a design.
- Able to use modern engineering tools for specification, design, implementation, and testing
- Effectively designs basic and advanced SQL queries to retrieve data from the database.

Semester-VI / Discipline Specific Elective II	**1.Python Programming Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Describe the Strings, List, Tuples and Dictionaries in Python.
- Demonstrate the power of Numbers, Math functions in python
- It enriches the knowledge in programming techniques using pattern matching concepts
- It enables to understand object oriented programming concepts.
- Experiment Python scripting language to develop innovative real time Applications.

List of Practicals:

1. Exercises using conditionals and loops.
2. Exercises for implementing functions.
3. Exercises using list and their built-in functions.
4. Exercises by implementing tuples.
5. Exercises using apply ( ), filter ( ), map ( ) and reduce ( ) functions.
6. Exercises by implementing Modules
7. Exercises by implementing classes and instances
8. Exercises by illustrating regular expression
9. Exercises for implementing files concept.
10. Exercises using strings and their built-in functions.
11. Retrieve nucleotide sequences and perform pair wise and multiple sequence alignment using BLAST tool and analyze the output
12. Retrieve nucleotide sequences and perform multiple sequence alignment using CLUSTALW tool and generate phylogenetic tree
13. Retrieve two nucleotide sequences to align and generate PAM & BLOSUM scoring matrix

Course Outcomes:

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

- Define the basic syntax and statements of Python programming, Syntax and idioms.
- Discuss the various decision making and construct statement of Python programming. Illustrate the essentials of the Python library.
- Apply object oriented programming concept in real time problems.
- Illustrate pattern matching and extraction using regular expression.
- Demonstrate mapping using file concept.

Semester-VI / Discipline Specific Elective II	**2.Internet with ASP Lab**	**Course Code:**
Instruction Hours: 3	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To enable the students to learn the fundamental concepts of ASP.NET.
- Maintain session and controls related information for user used in multi-user web applications
- Understand the fundamentals of developing modular application by using object oriented methodologies
- Use AJAX to create partial-page updates that refresh only the parts of the Web page that have changed.
- Connecting to data sources and managing them.

List of Practical's:

1. Form Design using Various Web Controls
2. Ad Rotator and Calendar Control, Login Control (Page should expire after 3 wrong attempts)
3. Validation Controls
4. Cookie Manipulation
5. State Management (using Session and Application)
6. Data Retrieval, Updating using ADO.NET (using Stored Procedure)
7. Template Creation using DataList and DataGrid
8. Sorting and Paging using DataGrid
9. Day Planner Preparation using XML and ADO•NET
10. Data Caching

Course Outcomes:

On completion of the Course, Students should be able to do

- Design forms using various web controls
- Apply rich controls and validation controls to the web page
- Illustrate cookies, session and application state in a web page
- Create and manipulate the data in the database using ADO.NET.
- Create a template using data list and data grid

Semester-VI / Discipline Specific Elective III	**1.Microprocessor Lab**	**Course Code:**
Instruction Hours: 4	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks: 60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To familiarize the students with the programming and interfacing of microprocessors and micro controllers.
- To provide strong foundation for designing real world applications using Microprocessors and micro controllers.
- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051.
- To introduce the basic concepts of microprocessor and to develop in students the Assembly language programming skills and real time applications of Microprocessor**.**

List of Practicals:

1. 8-bit addition, subtraction, multiplication and division
2. Multi byte addition and subtraction
3. Sum of series (8-bit)
4. Data transfer from one part of the memory to another
5. Maximum and minimum values
6. Sorting (Ascending and Descending order)
7. Hexadecimal to decimal and decimal to hexadecimal conversion (simple logic only)

Course Outcomes:

On completion of this lab course the learner will be able to,

- Understand and apply the fundamentals of assembly level programming of microprocessors.
- To develop in students the assembly language programming skills.
- Understand 8085 microprocessor kit, knowledge of 8085 instruction set and ability to utilize it in assembly language programming.
- Understand real mode Memory addressing and ability to interface various devices to the microprocessor.
- Provide practical hands-on experience with microprocessor applications and interfacing technique

Semester-VI / Discipline Specific Course III	**2.UI/UX Design and Animation Lab Using Open Source Tools**	**Course Code:**
Instruction Hours: 4	**Credits: 3**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- Demonstrate the techniques of photo editing.
- Apply layer masks, filters and blending modes, share and save your images invarious formats.
- Demonstrate the techniques for resize and crop images.
- Learn various retouching and repairing techniques to correct images.
- Learn the creation of various shapes and working with various files.

List of Practicals:

Photoshop:

1. Create scenery using Photoshop brushes.
2. Demonstrate the use of layer effects.
3. Demonstrate the use of ripple effect and lens flare.
4. Coloring a BW photo.
5. Create photo frame effect.
6. Create a 3D Photo effect.
7. Create 2D and 3D logos.
8. Create a Christmas Tree with Blinking Lights.
9. Animate a candle flame using Liquify filter

Adobe Illustrator

1. Working with files.
2. Working in layers.
3. Viewing artwork.
4. Creating Basic Shapes.
5. Working with type.
6. Placing Images.
7. Working with Objects.
8. Drawing graphs.
9. Working with imported artwork.

Course Outcomes:

On completion of this lab course the learner will be able to,

- Understand the Usability of Interactive systems.
- Understand Guidelines
- Understand Principles
- Be able to manage the development process
- Interaction styles

Semester-VI/ (SEC-IV) **Skill Enhancement Course-IV**	**Data Visualization Tool Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks :40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1-Acquire / Remember	K2-Understanding	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Objectives:

- To Understand the importance of data visualization for business intelligence and decision making.
- To Know approaches to understand visual perception
- To Learn about categories of visualization and application areas
- To Familiarize with the data visualization tools
- To Gain knowledge of effective data visuals to solve workplace problems

List of Practicals:

1. Create a bar chart for the given data
2. Create a pie chart for the given data
3. Create a scatter chart for the given data
4. Create a time series chart for the given data
5. Create a bullet chart for the given data
6. Create a area chart for the given data
7. Create a heat map for the given data
8. Create a geo map for the given data
9. Create a filled map for the given data
10. Create a dashboard and format it.

Course Outcomes:

On completion of the Lab, learner should be able to

- Design and create data visualizations.
- Conduct exploratory data analysis using visualization.
- Craft visual presentations of data for effective communication.
- Use knowledge of perception.
- Cognition to evaluate visualization design alternatives.

Mapping of Cos with Pos & PSOs:

CO/PO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S - Strongly Correlating
M - Moderately Correlating
W-Weakly Correlating
N – No Correlation

Semester-VI / Ability Enhancement Course- III (AEC-III)	**IoT Lab**	**Course Code:**
Instruction Hours: 2	**Credits: 2**	**Exam Hours: 3**
Internal Marks : 40	**External Marks:60**	**Total Marks: 100**

Knowledge Level

K1 -Recalling
K2 -Understanding
K3 -Applying
K4 - Analyzing
K5 - Evaluating
K6 - Creating

Course Objectives:

- Focus on research design and development of IoT enabled technologies which are cost effective and socially relevant.
- The interconnection and integration of the physical world and the cyber space.
- They are also able to design & develop IoT Devices
- This laboratory provides extensive hands-on to design various embedded system and exposes with the tools required to turn them into IoTs.
- Various fields of engineering such as embedded system, wireless sensor networks, control system, automation systems are together interconnected to form the Internet of Things (IoT).

List of Practical's:

1. Exercises on domain specific applications of IoT
2. Exercises on Gas Sensor based application using Simulators.
3. Exercises on PIR Sensor based application using Simulators.
4. Exercises on Touch Sensor based application using Simulators
5. Exercises Using Microcontroller based Embedded Platforms in IoT
6. Exercises on Traffic light Management with Delay
7. Exercise on People counting using IR Sensor
8. Exercise on Soil Moisturizer with Arduino.

Course Outcomes:

On completion of the Course, Students should be able to do

- Understand the basic concepts of IoT
- Design Embedded platforms in IoT using Microprocessor.
- Apply wireless peripherals for exchange of data.
- Apply Cloud Platform to Upload and Analyze the Sensor Data.
- Deploy simple application of IoT for Real time

Semester-VI / GS	**GENDER STUDIES**	**Course Code:**
Instruction Hours: 1	**Credits: 1**	**Exam Hours: 3**
Internal Marks :25	**External Marks:75**	**Total Marks: 100**

OBJECTIVES:

- To make students to aware of Gender constructions and gendering Process
- To explore existing gender biases in the society and to understand the need to work towards the inclusive society
- To inculcate sensitivity and build gender perspectives.
- To use the course to bring attitudinal cum behavioral changes towards gender neutralambience and promote the humanistic values o use the course
- To bring attitudinal cum behavioral changes towards gender neutral ambience andpromote the humanistic values

Units	**Contents**	**Hours**
I	**INTRODUCTION TO GENDER STUDIES CONCEPTS** Gender Spectrum.-Sex – Gender distinction – Biological Determinism – Patriarchy – Feminism –Gender Socialization and Stereotyping-Gender Discrimination – Gender Division of labour and roles– Gender Sensitivity and awareness – Gender Equity – Equality – Gender Main streaming and Gender Analysis.	3
II	**UGC INITIATIVES ON WOMEN'S STUDIES** Definition of Women's Studies –Gender Studies –UGC Initiatives and guidelines on Women's Studies - Beijing Conference, UN Initiatives – Convention on Elimination of All forms of Discrimination Against Women (CEDAW)- Sustainable Development Goals on Gender Equality (SDG 5) and targets	3
III	**AREAS OF GENDER DISCRIMINATION** Gender Socialization- Sex Ratio– Health and Nutrition– Literacy and Education - Employment- Governance – participation in decision making- politics- property rights and access to credit- gender based violence- Social institutions – Family, Caste, Class, religion, gender, State. Market – Media – Politics – Judiciary	3

IV	**WOMEN DEVELOPMENT AND GENDER EMPOWERMENT** Towards Equality Report of Status of Women in India 1974 – International Women's Decade – International Women's Year – National Policy for Empowerment of Women 2001	3
V	**WOMEN'S MOVEMENTS AND SAFEGUARDING MECHANISM :** In India National /State Commission for Women(NCW) – All Women Police Station – Family Court Legislations safeguarding women –Transgender Policy—Constitutional amendments for women's political participation	3
VI	**CURRENT CONTOURS: (for continuous internal assessment only):** Tamil Nadu State Policy for Women 2021- National Policy for Women 2015 – Prevention of Sexual Harassment at Work places Act 2013- Protection of Children from Sexual Offences Act, 2012 - Analysis of regressive and progressive High court and supreme court judgments- women proactive policies, programmes, interventions	3

REFERENCE :

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited ,2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited,1993
4. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication,2000
5. Mishra .O.P,Law Relating to Women &Child ,Allahabad :Central Law Agency 2001
6. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication 2003
7. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission forWomen ,2002
8. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999
9. https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/

Semester-VI / Extra Credit CourseVI(VAC-II)	**Cyber Security**	**Course Code:**
Instruction Hours: -	**Credits: 2**	**Exam Hours: -**
Internal Marks :-	**External Marks:100**	**Total Marks: Grade**

Knowledge Level

K1-Acquire / Remember
K2-Understanding
K3-Apply
K4-Analyze
K5-Evaluate
K6-Create

Course Objectives:

- Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization.
- Practice with an expertise in academics to design and implement security solutions.
- Understand key terms and concepts in Cryptography, Governance and Compliance.
- Develop cyber security strategies and policies
- Understand principles of web security and to guarantee a secure network by monitoring and analyzing the nature of attacks through cyber/computer forensics software/tools.

UNIT	CONTENT	HOURS
UNIT I	Introduction: Generations of Computer, Types of Computer - Functional units of a computer systemInput Devices -Output devices – Memory – Storage Devices. Number Systems: Decimal, Binary,Octal and Hexadecimal – Conversion –Computer Codes- Binary Addition, Subtraction- Complements.	
UNIT II	Information security: History of IS-What is security -characteristic of IS-components of an Information system –Security System Development Life Cycle model. – Information Security for technical Administrators: server security- network security	
UNIT III	Introduction to Cyber Security: Importance and challenges in Cyber Security - Cyberspace – Cyber threats - Cyber warfare - CIA Triad - Cyber Terrorism - Cyber Security of Critical Infrastructure -Cyber security -Organizational Implications.	
UNIT IV	Cryptography: Concepts and techniques-Plain text and cipher text- Encryption Principles-Cryptanalysis.Authentication methods-passwords-keys versus passwords-Attacking Systems via passwords-Password	
UNIT V	Applications of cryptographic Hash Functions: Message authentication- Digital Signatures-Other.Applications-Two simple Hash Functions-Cyber Security tools.	

Text Book:

1.PKSinha&PritiSinhaComputerFundamentals8th Edition, BPBPublications2004

2 Donaldson, S.,Siegel, S.,Williams, C.K.,Aslam, A"Enterprise Cybersecurity -How to Build a Successful Cyber defenseProgram againstAdvanced ThreatsA Press, 1st edition 2015

3 Nina Godbole,Sumit BelapureCyber Security Willey 2011

4 WilliamStallingsCryptography andNetwork Security:Principles and PracticesPHI 7th Edition, 2020

Reference Books:

1. Devan N. Shah Information SecurityPrinciples and Practice Wiley India 2009
2. GeorgeK.Kostopoulous Cyber Space andCyber Security CRC Press 2013Pedagogy Chalk and talk PPT, Discussion, Assignment, Demo, Quiz, Case study.Course DesignerDr.J.Maria Shyla

Course Outcomes:

- Analyze and evaluate the cyber security needs of an organization.
- Measure the performance and troubleshoot cyber security systems.
- Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators
- Design and develop a security architecture for an organization.
- Design operational and strategic cyber security strategies and policies.