VIVEKANANDHA

COLLEGE OF ARTS AND SCIENCES FOR WOMEN

ELAYAMPALAYAM, TIRUCHENGODE (Tk.), NAMAKKAL (Dt.).

(An ISO 9001 : 2008 Institutions Affiliated to Periyar University,
Approved by AICTE & Re-accredited with 'A' Grade by NAAC)
Recognized under section 2(f) & 12(b) of UGC Act, 1956

AUTONOMOUS

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

BCA

SYLLABUS & REGULATIONS

FOR CANDIDATES ADMITTED FROM 2020 – 2021

ONWARDS UNDER AUTONOMOUS & CBCS & OBE PATTERN

VIVEKANANDHA EDUCATIONAL INSTITUTIONS
Angammal Educational Trust
Elayampalayam, Tiruchengode (Tk.), Namakkal (Dt.)

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)

BCA

(BACHALOR COMPUTER APPLICATIONS)

(Candidates admitted from 2020-2021 onwards)

REGULATIONS

I. SCOPE OF THE PROGRAMME

The IT boom and the rapid growth in science and technology have opened up new vistas of job opportunities .The college offers Bachelor of Computer Applications which seeks to equip the learners to meet the spiraling demand of the IT industry. It provides special training in computer application of software's. The syllabus has been designed at a level equal to that of professional courses. Focus is also on developing soft skills of the students.

II. SALIENT FEATURES

- Qualified and Experienced team of faculty members with varied experience in areas of System Software, Computer Architecture, Artificial Intelligence, Mobile and Computer Networks, Graphics and Image Processing and Database Management System
- Motivating of students enhanced with immense expertise, massive technical exposure & structured creative initiatives.
- Industrial visits to various renowned companies are arranged to give an exposure to the students.
- Students are taught by using Audio Visual aids like OHP's & LCD Projectors and modern E-learning
- Course is specially designed for a higher level Career Placement.
- Project work is included in the syllabus to enhance conceptual, analytical & deductive skills.

III. OBJECTIVES OF THE PROGRAMME

- To produce a highly qualified professionals impart of both theoretical and practical knowledge in computer systems and its application.
- To produce fully skilled and trained manpower capable of solving the software & hardware problems, and discovering software solutions related to business organizations.
- To provide an in-depth knowledge of specific sub-disciplines chosen by the students as areas of special interest in the form of elective courses.
- The BCA Program is aimed at providing a platform to the students to enhance their skills in various fields of Computer Science & Information Technology like Hardware, Software development, Networking, Database Management & IT enabled services and to facilitate students to interact with IT professionals, Industry Partners & Academicians from IT and related areas.
- The courses is designed to develop computer professionals versatile is use of computers in almost all field of computer application .The main emphasis of the course is an applied computer use in various fields.

IV. ELIGIBILITY FOR ADMISSION

A candidate who has passed in Higher Secondary Examination with Mathematics or Business Mathematics or Computer Science or Statistics (Academic stream or Vocational stream) as one of the subject under Higher Secondary Board of Examination, Tamil Nadu as per norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed there to are permitted to appear and qualify for the Bachelor of Computer Application degree examination after a course of study of three academic years.

V. DURATION OF THE PROGRAMME

- The course shall extend over a period of three academic years consisting of six semesters. Each academic year will be divided into two semesters. The First semester will consist of the period from July to November and the Second semester from December to March.
- The subjects of the study shall be in accordance with the syllabus prescribed from time to time by the Board of Studies of Vivekanandha College of Arts and Sciences for Women with the approval of Periyar University, Salem.
- Each subject will have four to six hours of lecture per week apart from practical training at the end of each semester.

VI. CONTINUOUS INTERNAL ASSESSMENT (CIA)

The performance of the students will be assessed continuously and the Internal

ASSESSMENT MARKS **FOR THEORY PAPERS** WILL BE AS UNDER:

1	Average of Two Tests	-	05
2	Model Exam	-	10
3	Assignment	-	05
4	Attendance	-	05
	Total	-	25

ASSESSMENT MARKS **FOR PRACTICAL PAPERS** WILL BE AS UNDER:

1	Model Exam	-	20
2	Observation Note	-	10
3	Attendance	-	10
	Total	-	40

PASSING MINIMUM - EXTERNAL

THEORY	In the End Semester Examinations, the passing minimum shall be 40% out of 75 Marks. (30 Marks)
PRACTICAL / MINI PROJECT	In the End Semester Examinations, the passing minimum shall be 40% out of 60 Marks. (24 Marks)

VII. ELIGIBILITY FOR EXAMINATION

A candidate will be permitted to appear for the University Examination only on learning 75 % of attendance and only when her conduct has been satisfactory. It shall be open to grant exemption to a candidate for valid reasons subject to conditions prescribed.

DISTRIBUTION OF MARKS FOR ATTENDANCE:

ATTENDANCE PERCENTAGE	MARKS	
	THEORY	PRACTICAL
75-80	1	2
81-85	2	4
86-90	3	6
91-95	4	8
96-100	5	10

VIII. CLASSIFICATION OF SUCCESSFUL CANDIDATES

Successful candidates passing the Examination of Core Courses (Main & Allied Subjects) & Securing Marks.

a) 75 % and above shall be declared to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the course at first appearance itself.
b) 60% and above but below 75 % shall be declared to have passed the Examinations in First Class..
c) 50% & above but below 60% shall be declared to have passed the examinations in Second Class.
d) All the remaining successful candidates shall be declared to have passed the examinations in Third Class.
e) Candidates who pass all the examinations prescribed for the course at the First appearance itself and within a period of Three Consecutive Academic years from the year of admission only will be eligible for University Rank.

IX. ELIGIBILITY FOR AWARD OF THE DEGREE

A candidate shall be eligible for the award of the Degree only if she has undergone the above Degree for a period of not less than Three Academic years comprising of six semesters and passed the Examinations prescribed and fulfilled such conditions has have been prescribed therefore.

X. PROCEDURE IN THE EVENT OF FAILURE

If a candidate fails in a particular subject, she may reappear for the university examination in the concerned subject in subsequent semesters and shall pass the examination.

XI. COMMENCEMENT OF THESE REGULATIONS

These regulations shall take effect from the academic year 2020-21 (i.e.,) for the students who are to be admitted to the First year of the course during the Academic year 2020-21 and thereafter.

XII. TRANSITORY PROVISIONS

Candidates who were admitted to the UG course of study before 2020-2021 shall be permitted to appear for the examinations under those regulations for the period of Three years ie., upto and inclusive of the Examinations of 2021-2022. Thereafter, they will be permitted to appear for the examinations only under the regulations then in force.

EVALUATION OF EXTERNAL EXAMINATIONS (EE)

QUESTION PAPER PATTERN – Theory	
Time duration: 3 Hours	**Max. Marks: 75**
PART- A: (20 x 1= 20)	Answer all the Questions Four Questions from each Unit
PART- B: (5 x 5 = 25)	Answer all the questions One Question from each Unit (Either or Type)
PART- C: (3 x 10 = 30)	Answer any **THREE** of the questions One Question from each Unit (3 Out of 5)
IN THE END SEMESTER EXAMINATIONS, THE PASSING MINIMUM SHALL BE 40% OUT OF 75 MARKS. (30 MARKS)	

QUESTION PAPER PATTERN – Practical	
Time duration: 3 Hours	**Max. Marks: 60**
1. One compulsory question from the given list of objectives	**30 Marks**
2. One either/or type question from the given list of objectives	**30 Marks**
IN THE END SEMESTER EXAMINATIONS, THE PASSING MINIMUM SHALL BE 40% OUT OF 60 MARKS. (24 MARKS)	

BCA CURRICULUM FOR ACADEMIC YEAR 2020 – 2021

COURSE PATTERN AND SCHEME OF EXAMINATIONS UNDER AUTONOMOUS, CBCS & OBE PATTERN

FOR THE CANDIDATES ADMITTED FROM THE YEAR 2020 – 2021

SEMESTER: I & II

SEM	PART	COURSE CODE	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
I	I	18U1LT01	Tamil – I	6	3	25	75	100
	II	17U1LE01B	English – I	6	3	25	75	100
	III	18U1MAA03	Allied – I: Paper – I: Numerical Methods	4	4	25	75	100
	III	20U1CAC01	Core: I Programming in C	4	4	25	75	100
	III	20U1CACP01	Practical – I: Programming in C Lab	4	3	40	60	100
	III	20U1CAC02	Core: II Fundamental of Computer Applications	4	4	25	75	100
	IV	18U1VE01	Value Education	2	2	25	75	100
			Total	**30**	**23**	**190**	**510**	**700**
II	I	18U2LT02	Tamil – II	6	3	25	75	100
	II	17U2LE02B	English – II	6	3	25	75	100
	III	18U2MAA06	Allied – I: Paper – II Discrete Mathematics	4	4	25	75	100
	III	20U2CAC03	Core: III Object Oriented Programming with C++ & Object Oriented Systems	5	5	25	75	100
	III	20U2CACP02	Practical – II: Programming in C++ Lab	5	3	40	60	100
	IV	18U1ES01	Environmental Studies	4	3	25	75	100
			Total	**30**	**21**	**165**	**435**	**600**

SEMESTER: III & IV

SEM	Part	Course Code	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
III	III	18U3CMA03	Allied – II: Paper – I: Financial Accounting	4	4	25	75	100
	III	20U3CAC04	Core: IV Data Structures & Algorithms	5	4	25	75	100
	III	20U3CAC05	Core: V Relational Database Management Systems	5	4	25	75	100
	III	20U3CAC06	Core: VI Operating Systems	5	4	25	75	100
	III	20U3CAS01	SBEC:I Internet of Things	2	2	25	75	100
	III	20U3CACP03	Practical- III: RDBMS Lab	5	5	40	60	100
	IV		NMEC – I:	2	2	25	75	100
			Library & Sports	2	0	-	-	-
	Total			**30**	**25**	**190**	**510**	**700**
IV	III	18U4CMA04	Allied – II: Paper – II Cost & Management Accounting	4	4	25	75	100
	III	20U4CAC07	Core: VII Software Engineering	5	4	25	75	100
	III	20U4CAC08	Core: VIII Visual Programming	5	4	25	75	100
	III	20U4CAC09	Core: IX Computer Networks & Security	5	5	25	75	100
	III	20U4CACP04	Practical: IV Visual Programming Lab	5	4	40	60	100
	III	20U4CAS02	SBEC:II DTP Package	2	2	40	60	100
	IV		NMEC – II	2	2	25	75	100
			Library & Sports	2	0	-	-	-
	Total			**30**	**25**	**205**	**495**	**700**

SEMESTER: V & VI

SEM	Part	COURSE CODE	COURSE TITLE	Hrs	CREDIT	MARKS		
						CIA	EE	TOT
V	III	20U5CAC10	Core: X Java Programming	5	4	25	75	100
	III	20U5CAC11	Core: XI PHP Programming	5	4	25	75	100
	III	20U5CAE__	Elective – I	5	3	25	75	100
	III	20U5CACP05	Practical: V Java Programming Lab	5	3	40	60	100
	III	20U5CACP06	Practical: VI PHP Programming Lab	4	3	40	60	100
	III	20U5CAC12	Core: XII Mobile Application Development	4	3	25	75	100
	IV	20U5CAS03	SBEC: III Soft Skills	2	2	25	75	100
	Total			**30**	**22**	**205**	**495**	**700**
VI	III	20U6CAC13	Core: XIII Computer Graphics	5	4	25	75	100
	III	20U6CAC14	Core: XIV Compiler Design	5	4	25	75	100
	III	20U6CAE__	Elective – II	5	4	25	75	100
	III	20U6CACP07	Practical – VII Computer Graphics Lab	4	3	40	60	100
	III	20U6CACPR01	PROJECT – I: Project Work (In - House Project)	5	3	40	60	100
	III	20U6CAC15	Core: XV Java Script	4	3	25	75	100
	IV	20U6CAS04	SBEC: IV: Designing Software - CorelDraws	2	2	25	75	100
	V	20U6EX01	Extension Activities	-	1	-	-	-
	Total			**30**	**24**	**205**	**495**	**700**
Grand Total				**180**	**140**	**1160**	**2940**	**4200**

ELECTIVE – I			ELECTIVE – II		
Semester	**Course Code**	**Title**	**Semester**	**Course Code**	**Title**
V	**18U5CAE01**	E – Commerce	VI	**18U6CAE04**	Digital Image Processing
	18U5CAE02	Software Quality Assurance		**18U6CAE05**	Big Data Analytics
	18U5CAE03	Software Testing		**18U6CAE06**	Grid Computing

DEPARTMENT OF COMPUTER APPLICATIONS
(BCA)

VISION OF THE DEPARTMENT

To provide high academic goals to the students and make them the world leaders both in educational and research through effective teaching.

MISSION OF THE DEPARTMENT

- To create, share and apply knowledge in Computer Science including inter disciplinary areas that extends the scope of Computer Science and benefit humanity.
- To educate students to be successful, ethical and effective problem solvers.
- To prepare the students to contribute positively to the economic well being of our region and nation.

PROGRAMME OUTCOMES

PO1 : To qualify the students to meet the needs of the region, state and nation to have an edge to compete globally.

PO2 : To help student think, react and work in innovative ways stimulated by a higher degree of disciplinary synergies that will promote transdisciplinary innovation and divergent thinking.

PO3 : To produce a highly qualified professionals impart of both theoretical and practical knowledge in Computer systems and its Application.

PO4 : To produce fully skilled and trained manpower capable of solving the software & hardware problems, and discovering software solutions related to business organizations.

PO5 : To provide an in-depth knowledge of specific sub-disciplines chosen by the students as areas of special interest in the form of elective courses.

PO6 : The courses is designed to develop computer professionals versatile is use of Computers in almost all field of computer application .The main emphasis of the course is an applied computer use in various fields.

PROGRAMME SPECIFIC OUTCOMES

BCA (COMPUTER APPLICATIONS)

AFTER COMPLETION OF THE PROGRAMME THE GRADUATES WILL BE ABLE TO

PSO1 : Students have a clear understanding of the concepts of key areas in Computer Applications.

PSO2 : Students are capable to analyze and apply latest technologies to solve problems in the areas of Computer Applications.

PSO3 : It makes them to analyze and synthesis computing systems through quantitative and qualitative techniques.

PSO4 : The BCA Program is aimed at providing a platform to the students to enhance their skills in various fields of Computer Science & Information Technology like

Hardware, Software development, Networking, Database Management & IT enabled services and to facilitate students to interact with IT professionals, Industry Partners & Academicians from IT and related areas.

« SEMESTER – I »

Semester	I	CORE: I **PROGRAMMING IN C**	Credit	4
Code	20U1CAC01		Hours	4

COURSE OBJECTIVE

This subject is to provide the students a strong foundation on programming concepts and its application. It also enables the students to solve problems using programmable logic.

COURSE OUTCOMES

CO1	**K1 K2 K3**	Understand the concepts of C programming language
CO2	**K1 K2 K3**	Describe the reason why different constructs are available for iteration, such as "for" loops, "do...while" loops
CO3	**K1 K2 K3 K4**	Providing by the user of a program or environment, in a context where the usual assumption is that functions are built into the program or environment.
CO4	**K1 K2 K3 K4**	Apply the concepts of Arrays, Strings and Functions in C.
CO5	**K1 K2 K3 K4**	Explore the concepts of pointers, structures, unions and files in C

Unit	Syllabus Contents	Number of Sessions
I	**Overview of C**: History of C – Importance of C – Basic structure of C programs. Constants, variables and data types: Character set – C Tokens – Keywords and identifiers – Constants – Variables – Declaration of storage classes – Assigning values to variables- Defining symbolic constants. Operators and expression – Evaluation of expressions – Precedence of arithmetic operators – Type conversions in expressions – Operator precedence and associatively.	12
II	**Decision making and branching**: Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF ladder, Switch statements – GOTO statements. **Decision making and looping**: WHILE statement – DO statement – FOR statement – Jumps in loops. **Arrays**: Definition & Declaration – One dimensional – Two dimensional – Multi dimensional arrays - Dynamic arrays.	12
III	**Character arrays and strings**: Introduction – Declaring and initializing string variables –String handling functions. User – **Defined functions:** Introduction – Need for user – Defined function – A Multi- function program – Elements of user – defined functions – Definition of functions – Return values and their types – Function calls – Function declaration – Categories of Functions.	12

IV	**Structures and Unions**: Introduction – Defining a structure – Declaring structure variables – Accessing structure members – Structure initialization – Copying and comparing structure variables – Arrays of structures – Arrays within structures – Structures within structures – Structures and functions – Unions – Size of structures – Bit fields. **Pointers:** Introduction – Understanding pointers – Accessing the address of a variable – Initializing of pointer variables. Chain of pointers – Pointer expressions – Pointers and arrays – Pointers and character strings – Arrays of pointers – Pointers as function arguments – Pointer and structures.	12
V	**File Management:** Introduction – Defining and opening a file –Closing a file – Input/Output operation on files – Error handling during I/O operations – Random access files – Command line arguments.	12

LEARNING RESOURCES	
Text Book	1. "Programming in ANSI C", E. Balgurusamy Tata McGraw Hill, New Delhi, 4th Edition
Reference Books	1. "C: The Complete Reference", Herbert Schildt, Mc Graw Hill, New Delhi, 4th Edition 2. "Programming In C", B.L.JUNEJA, Cengage Learning India 3. "Programming In ANSI C", E. Balagurusamy TMG Hill, New Delhi, 5th Edition.
Web Site / Links	1. https://docs.google.com/file/d/0B3OzFFMgEP0tU3RVcmh2Wm5ZUWs/edit 2. http://www.sebizfinishingschool.com/ebook/java/Java%202%20-%20The%20Complete%20Reference%20(5th%20Edition).pdf 3. https://savedparadigms.files.wordpress.com/2014/09/harbison-s-p-steele-g-l-c-a-reference-manual-5th-ed.pdf 4. http://amarblog.yolasite.com/resources/pdf/c%2B%2B.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			
CO2	✓	✓		✓
CO3		✓	✓	✓
CO4		✓	✓	✓
CO5		✓	✓	✓

Semester	I	Core - II Fundamental of Computer Applications	Credit	4
Code	20U1CACO2		Hours	4

COURSE OBJECTIVE

- To acquire knowledge on the principles of computer organization
- To understand the basic concepts of number theory, Boolean algebra, combinational and sequential logic circuit.

COURSE OUTCOMES

CO1	**K1 K2 K4**	Understand the types of Computers and Generation of Computers.
CO2	**K1 K2 K3**	Explain the different types of number systems and Conversion of one number system to another number system.
CO3	**K1 K2 K4**	Discuss the Functions and basic Components of Computer System.
CO4	**K3 K4**	To know about the Classification of Input Devices.
CO5	**K4 K5 K6**	Understanding about Output devices and mechanisms.

UNIT	SYLLABUS CONTENTS	LEVELS	No. OF SESSIONS
I	**INTRODUCTION TO COMPUTERS:** Introduction – Types of Computers - Characteristics of Computers. **FIVE GENERATIONS OF MODERN COMPUTERS:** First Generation (1945-1956) – Second Generation Computers (1956-1963) – Third Generation Computers (1964-1971) – Fourth Generation Computers (1971- Present) – Fifth Generation Computers (Present and Beyond).	K1 K2	10
II	**NUMBER SYSTEM:** Introduction – Decimal Number System – Binary Number System – Binary – Decimal Conversion – Decimal – Binary Conversion – Binary Addition – Binary Subtraction – Complements - 9's, 10's, 1's 2's Complement - Signed and Unsigned Number Representation – Fixed – Point Representation of Numbers – Floating – Point Representation of Numbers – Binary Coded Decimal (BCD) – Gray Code – Excess 3 code – ASCII Code - ASCII-8 Code – EBCDIC Code – Bits, Bytes and Words – Octal Number system - Hexadecimal Number System.	K1 K3	10
III	**ANATOMY OF COMPUTERS:** Functions and Components of a Computers – Central Processing Unit(CPU) – Control Unit – Arithmetic-Logic Unit(ALU) – Memory – Registers – Addresses. **MEMORY UNITS:** Introduction – RAM – ROM – PROM – EPROM – EEPROM – Flash Memory - Classification of Digital Computers: Introduction – Microcomputers – Personal Computers – Workstations – Personal Computers(PCs) – Workstations – Portable Computers – Minicomputers – Mainframes – Supercomputers – Network Computers.	K1 K2 K4	10

IV	**INPUT DEVICES:** Keyboard – Mouse – Digitizing Tablet – Scanners – Keyboard – Mouse – Digitizing Tablet – Scanners – Optical Mark Recognition – Bar Code Reader. **OUTPUT DEVICES:** Classification of Monitor-Based on Color – Classification of Monitor- IV Based on Signals – Printer – Daisy Wheel Printer – Dot Matrix Printer – Ink Jet Printer – Laser Printer. Auxiliary Storage Devices: Magnetic Tape – Hard Disk – Floppy Disk – Zip Disk – Optical Disk – CD-ROM – CD-Disks. COMPUTER SOFTWARE: Operating System – Utilities – Compilers and Interpreters	K1 K3 K4	10
V	PROGRAMMING LANGUAGES: Machine Languages – Assembly Languages – High Level Languages – Types of High Level Languages – Procedural Oriented Languages - Problem Oriented Languages & Application Generators – Natural Languages – Compilers and Interpreters – The Compilation Process – OPERATING SYSTEM: Functions of an Operating System – Job Management – Batch Management – Online Processing – Data Management – Virtual Storage – Input/ Output Management – Classification of Operating System. COMPUTER NETWORKS: Types of Networks – local Area Network (LAN) – Wide Area Network (WAN) – Network Topologies – Star Network – Ring Network – Bus Network – Network Protocols – Network Architecture – Peer-Peer Architecture – Client/Server Architecture.	K1 K3 K4	10

LEARNING RESOURCES	
Text Book	2. "Fundamentals of Computer Science and Communication Engineering", Alexis Leon Mathews Leon, Leon TECH World, UBS Publishers.
Reference Books	4. "Fundamentals of Computers", PHI Learning Private Ltd., V. Rajaraman 5. "Introduction to Information Systems" Vijay Nicole Imprints Private Ltd., Alexis Leon, Mathews Leon. 6. "Computer Fundamentals and Applications", VIKAS Publications House Private Ltd., Ashok Arora.
Website/Links	1.https://www.tutorialspoint.com/ 2.http://www.ddegjust.ac.in/studymaterial/ 3.http://buc.edu.in/sde_book/

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			
CO2	✓	✓		✓
CO3	✓		✓	
CO4		✓		✓
CO5	✓		✓	

Semester	I	Practical: I **PROGRAMMING IN C LAB**	Credit	3
Code	20U1CACP01		Hours	4

COURSE OBJECTIVE

- To acquire knowledge in the domain of C Programming
- To implement real time problems using C Programming concept

COURSE OUTCOMES

CO1	**K1**	Design algorithms for the given problem specifications.
CO2	**K1 K2**	Write C programs for the designed algorithm specification.
CO3	**K1 K2 K3**	Write C programs to implement control and looping statements
CO4	**K1 K2**	Write C programs to implement arrays and functions.
CO5	**K1 K4 K5**	Write C programs to implement structures and files

LIST OF PROGRAMS: **Hours: 50**

1. Program to find the Factorial of N Numbers.
2. Program to find the Fibonacci series of N numbers.
3. Program to find the solution for the Quadratic Equation (All Cases)
4. Program to Sort and find the largest and smallest of the given array of numbers.
5. Program to implement Matrix Manipulation.
6. Program to check whether the given string is Palindrome or not.
7. Program to implement string handling functions.
8. Sorting the given names in Ascending and Descending order.
9. Program to Swap two numbers using functions.
10. Program to prepare Student Mark list using structure.

Mapping with Program Outcomes

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		
CO2	✓	✓	✓	✓
CO3			✓	✓
CO4	✓		✓	✓
CO5	✓		✓	✓

« SEMESTER – II »

Semester	II	Core: III OBJECT ORIENTED PROGRAMMING WITH C++ & OBJECT ORIENTED SYSTEMS	Credit	5
Code	20U2CAC03		Hours	5

COURSE OBJECTIVE

To learn the basic concepts of object oriented programming & the syntax of C++ language. To impart the programming skills C++ and the concepts of Object Oriented Software Development Life Cycle and about Unified Modeling Language.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Distinguish between Structured and Object Oriented problem solving approaches and apply them based on the problem given	K1 K2 K3
CO2	Identify classes and objects from the given problem description and able to create classes and objects using C++	K1 K2 K3
CO3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism.	K1 K3 K4
CO4	Understand the complexity of Industrial Strength Software and the application of Unified Process Model.	K1 K3 K5

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Basic Concepts of OOP** – Benefits of OOP – Applications of OOP -Structure of C++ - Applications of C++ -Tokens- Keywords- Identifiers and Constant-Data types - Variables – Operators-Manipulators-Expressions- Control Structures. **Functions** – Prototype- Call by Reference- Return by reference- Inline Functions- Default Arguments- const Arguments- Function Overloading- Friend and Virtual Function.	K1	12
II	**Classes and Objects** – Class – Member Functions-Array with in a class- Memory Allocation for Objects- Static data members – Static member function- Array of Objects- Objects as Function Arguments – Friendly Functions-Returning Objects-const Member Functions- Pointers to Members, Constructors and Destructors. Operator Overloading and type conversions	K1 K2	12
III	**Inheritance:** Extending classes- Derived Classes- single inheritance- Multilevel Inheritance- Multiple Inheritance- Hierarchical Inheritance- Hybrid Inheritance- Virtual Base Classes- Abstract Classes, Pointers, virtual Functions and Polymorphism: Pointers – Pointers to Objects – these Pointers Virtual Functions – Pure Virtual Functions.	K1 K2 K4	12

IV	**Managing I/O Operations**: Streams in C++ - C++ Stream Classes – Formatted and Unformatted I/O Operations Managing Output with Manipulators **Templates:** Class templates- Class templates with Multiple Parameters- Function templates- Function Templates with Multiple Parameters- overloading of Templates Functions- Member Function Templates- Non- type template arguments	K2 K3 K4	12
V	**Object** - Oriented System Development Life Cycle. : Introduction – The software development process – Building High – Quality software – Object – Oriented System Development – Reusability. **Unified Modeling Language:** Introduction – Static and Dynamic models – UML Diagrams – UML class Diagram – Use – case Diagram – UML dynamic modeling – UML Extensibility – UML Meta Model.	K2 K3 K5	12

LEARNING RESOURCES	
Text Books	1. E.Balagurusamy, "**Object-Oriented Programming with C++",** Tata McGraw Hill Publishing Company Limited, New Delhi ,Second Edition, 2001. UNIT-I(CHAPTER 1, 2, 3, 4) UNIT-II (CHAPTER - 5, 6, 7) UNIT-III (CHAPTER - 8, 9, 10), UNIT – IV (CHAPTER - 11, 12, 13). 2. Bahrami "**Object Oriented Systems**", McGraw Hill International Edition, 1999. UNIT-V (CHAPTER 3, 5)
Reference Books	1. Robert Lafore, " Object Oriented Programming in Turbo C++", Galgotia ,2001. 2. Herbert Schildt, "Teach Yourself C++", Third Edition. Tata McGraw Hill, 5th Reprint, 2000 3. K.R Venu Gopal , Rajkumar, T.Ravishankar, "Mastering C++",TMG Ltd, New Delhi
Web Site / Links	1. https://bookstore.github.io/cse/secondyear/Balaguruswamy%20Object%20Oriented%20Programming%20With%20C++%20Fourth%20Edition.pdf 2. http://www.ddegjust.ac.in/studymaterial/mca-3/ms-17.pdf 3. https://www.scribd.com/doc/272353233/Object-Oriented-Programming-in-C-Balaguruswamy-pdf

MAPPING WITH PROGRAM OUTCOMES

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓
CO2	✓	✓		
CO3	✓		✓	✓
CO4	✓	✓	✓	✓

Semester	II	Practical: II PROGRAMMING IN C++ LAB	Credit	3
Code	20U2CACP02		Hours	5

COURSE OBJECTIVE

Formulate all techniques of software development in the C++ Programming Language and demonstrate these techniques by the solution of a variety of problems spanning the breadth of the language.

COURSE OUTCOMES

CO Number	CO Statement	Knowledge Level
CO1	Explain the concepts of oops for building object based applications	K1 K2
CO2	Write a program in different logic with suitable validations for a given problem	K1 K2 K3
CO3	Implement the techniques and features of the Object Oriented Programming constructs to construct an application	K1 K2 K4
CO4	Implement method overloading and method overriding for different user specifications	K1 K4 K5
CO5	Write programs implementing inheritance for an application domain	K3 K4 K5

LIST OF PROGRAMS:

S No List of Programs

1. Programs using Classes and Objects.
2. Constructors & Destructors.
3. Array of objects, Passing objects as Function arguments.
4. Inline Functions
5. Function overloading
6. Operator overloading
7. Inheritance (Any Two Types)
8. Dynamic Polymorphism – Virtual Functions.
9. Templates
10. Friend Function

MAPPING WITH PROGRAM OUTCOMES

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	✓
CO2	✓	✓		
CO3		✓	✓	✓
CO4	✓	✓	✓	✓
CO5	✓	✓	✓	✓

« SEMESTER – III »

Semester	III	CORE: IV	Credit	4
Code	20U3CAC04	**DATA STRUCTURES AND ALGORITHMS**	Hours	5

COURSE OBJECTIVE

Be familiar with basic techniques of algorithm analysis. Master the implementation of linked data structures such as linked lists and binary trees. Be familiar with some graph algorithms such as shortest path and minimum spanning tree.

COURSE OUTCOMES

CO1	**K1 K2**	Understanding the basic concepts of Data Structures and Stacks.
CO2	**K1 K4 K5**	Exploring the different concepts of queues and linked lists.
CO3	**K2 K3**	To understand the trees concept Types of trees.
CO4	**K3 K4**	To solve the problems using algorithms in Graphs.
CO5	**K5**	To know the Sorting and Searching Techniques.

Unit	Syllabus Contents	Levels	No. of Sessions
I	INTRODUCTION AND OVERVIEW: Definition – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures**.** STACKS: Definition – Representation of Stack – Operations on Stacks. Applications of Stack: Tower of Hanoi problem	**K1 K2**	**10**
II	QUEUES: Definition – Representation of Queues – Various Queue structures: Circular Queue – Dequeue – Priority Queue. Applications of Queues: Round Robin Algorithm. LINKED LISTS: Definition – Single Linked List – Double Linked List.	**K1 K4 K5**	**10**
III	TREES: Basic Terminologies – Definition and Concepts – Representation of Binary trees – Operations on Binary tree – TYPES: Expression Tree – Binary Search Tree – Heap Trees.	**K2 K3**	**10**
IV	GRAPHS: Graph Terminologies **-** Representation of Graphs – Operations of Graph – Applications of graph: Shortest path problem – Minimum spanning Tree.	**K3 K4**	**10**
V	SORTING: Basic Terminologies – Sorting Techniques –Heap Sort – Shell Sort – Quick Sort – Merge Sort. SEARCHING: Basic Terminologies – Linear Search Technique: Binary Search.	**K5**	**10**

Learning Resources	
Text Books	Debasis Samanta, "Classic Data Structures" PHI Learning private Limited. 2ND Ed.
Reference Books	1. Ellis Horowitz , Sartaj Sahni and Susan Anderson, "Fundamentals of Data Structures using C" Computer Science Press, 1993. 2. Jean Paul Tremblay and Paul G. Sorenson, "An Introduction to data structures with applications" 2nd edition, Tata McGraw-Hill, 2001. 3. "Data Structures And Algorithms" –Alfred V. Aho,John E.Hopcroft,Jeffrey D.Ullman, Pearson Education,Inc And Dorling Kindersley Publishing Inc.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	
CO2		✓	✓	
CO3	✓		✓	✓
CO4		✓		✓
CO5			✓	✓

Semester	III	CORE - V	Credit	4
Code	20U3CAC05	RELATIONAL DATABASE MANAGEMENT SYSTEM	Hours	5

COURSE OBJECTIVE

To enable the students to learn the database system Relational algebra and calculus, normal forms, parallel and distributed system.

COURSE OUTCOMES

CO1	**K1 K2**	Understand the concepts of Database Concepts and Characteristics.
CO2	**K1 K3**	Learning Architecture & Design of Databases
CO3	**K2 K3**	Designing ER Model Diagram & Understanding RDBMS
CO4	**K2 K4**	Applying Normalization to databases using SQL Comments
CO5	**K4 K5**	Explore the concepts of PL/SQL Concepts

UNIT	SYLLABUS CONTENTS	Levels	No. OF SESSIONS
I	Introduction to DBMS: Information – Data and Data Management – File based data management – Organization of a Database – Characteristics of a Data in a Database – DBMS: Benefits of DBMS – Functions of DBMS – Components of DBMS – Data Dictionary – Data Base Users.	K1	10
II	Data Base Architecture and Design: Introduction – Data base architecture – Data Abstraction – Database Language – Data Base Design – Design Constraints. Data Models: Introduction – Conceptual, Physical & Logical Database Model – Database Relationship – Hierarchical Model – Network Model – Relational Model – ER Model – Object Oriented Model – Object Relational.	K1 K2	10
III	Entity Relationship Model: Introduction – ER Model – Components of ER model – ER Diagram Conversions – Relationships – Composite Entities – Entity List – ER Diagrams – ER Modeling Symbols. RDBMS: Introduction – RDBMS terminology – Relational Data Structure – CODD'S Rules Relational Data Integrity & Database Constraints: Introduction – Integrity Constraint.	K2 K3	10
IV	Data Normalization: Introduction – Pitfalls in Relational Database Design – Decomposition – Normalization: Keys – relationships – Types of Normal forms – De-normalization. Relational Algebra: Introduction – Relational Algebraic Operations. SQL: Introduction – History of SQL – characteristics of SQL – Types of SQL Commands – SQL Operators.	K4	10
V	Views and Indexes: Introduction – Views – Indexes. Aggregate functions – INSERT, UPDATE and DELETE operations– Join and Union. PL/SQL: Programming language: History – Fundamentals – Block Structure – Data types – Other Data	K5	10

	Types – Declaration – Assignment operation. PL/SQL cursor and exceptions.		

LEARNING RESOURCES	
Text Book	3. C. Muthu "Visual Basic .Net" McGraw-Hill Education (India) Pvt.Ltd Reprint 2010.
Reference Books	7. Silberschatz, Korth, "Database System Concepts" MCH International Sixth Edition.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2		✓		
CO3	✓		✓	
CO4				✓
CO5		✓		

Semester	III	Core: VI	Credit	4
Code	20U3CAC06	**OPERATING SYSTEMS**	Hours	5

COURSE OBJECTIVE

1. Knowledge on Operating system and how it controls the information and hardware.
2. To inculcate knowledge on OS concepts and functioning of modern OS.

COURSE OUTCOMES

CO1	**K1 K2**	To improve the knowledge in Operating Systems and their process concepts.
CO2	**K1 K2 K4**	Provides complete information about Thread concepts and execution procedures and problems.
CO3	**K3K4 K5**	Explains about deadlock Concepts and gives a clear cut idea on different process scheduling.
CO4	**K1 K4**	Exploring about memory management concepts and virtual memory.
CO5	**K2 K4**	Understanding about File and Database Systems.

Unit	Syllabus Contents	Levels	No. of Sessions
I	**Operating System** – Application Bases – Operating System Environment – Operating System Components and Goals – Operating System Architecture - **Process Concepts**: Introduction – Process Management – Inter Process Communication.	**K1 K2 K3**	**10**
II	**Thread Concepts:** Definition Of Thread – Life Cycle Of Thread – Thread Operations – Threading Models - Thread Implementations – **Asynchronous Concurrent Execution**: Mutual Exclusion – Software Solutions to the Mutual Exclusion Problem –Semaphores.	**K1 K2K4**	**10**
III	**Deadlock:** Introduction – Examples of Deadlock – Resource Concept – Deadlock Prevention – Deadlock Avoidance with Dijstra's Banker's Algorithm – Deadlock Detection – Deadlock Recovery. **Process Scheduling:** Scheduling Levels - Preemptive Vs Non-Preemptive Scheduling – Scheduling Algorithm – Real-Time Scheduling.	**K3 K4 K5**	**10**
IV	**Memory Management** – Single-user Contiguous Memory Allocation – Fixed Partition Multiprogramming –Variable Partition Multi-programming – Multiprogramming With Memory Swapping. Virtual Memory **Management:** Introduction - Demand Paging - Page Replacement - Page Replacement Strategies.	**K1 K4**	**10**
V	**File and Database Systems:** File Systems – File Allocation – File Space Management - File Access Control.	**K2 K4**	**10**

Learning Resources	
Text Books	H.M.Deitel, P.J.Deitel, D.R.Choffnes, "**Operating Systems**" 3rd Edition, Pearson Publication.(Chapter-1,3,4,5,7,8,9,11,13).
Reference	1.William Stallings "Operating Systems – Internals & Design Principles" PHI (P) Ltd, New Delhi – 110001. 5th Ed.

Books	2. Operating Systems – Achyut Godbole, 2nd Edition, TMH. 3. Operating Systems Concepts and Design – Milan Milankovic, 2nd Ed, TMH.
Website / Links	http://www.tutorialspoint.com/operating_system/ http://viralpatel.net/taj/operating-system-tutorial.php

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓
CO2	✓	✓	✓	✓
CO3		✓	✓	
CO4	✓			✓
CO5		✓	✓	

Semester	III	SBEC: I INTERNET OF THINGS	Credit	2
Code	20U3CAS01		Hours	2

COURSE OBJECTIVE

1. Obtain an overview of IoT applications.
2. Comprehend the architecture, design principles and standards of IoT.
3. Understand M2M and IoT technology fundamentals.
4. Knowing about Python language.

COURSE OUTCOMES

CO1	**K1 K2**	To know about the evolution for mobile, home and embedded applications that is connected to the internet, to integrate communication.
CO2	**K3**	To gather knowledge about how the devices share the data on the cloud and analyze it in a secure manner on the network.
CO3	**K3 K4**	To know how the industries are adopting internet-of-things-solutions to improve their existing systems.
CO4	**K5**	To get knowledge about how the things to be connected with various devices.
CO5	**K5 K6**	To get familiar about python data types and control statements.

Unit	Syllabus Contents	Levels	No. of Sessions
I	Introduction To Internet of Things: Introduction - Physical Design of IoT - Things in IoT, IoT Protocols - Logical Design of IoT - IoT Functional Blocks, IoT Communication Models, IoT Communication APIs.	**K1 K2**	**05**
II	IoT Enabled Technologies: Wireless Sensor Networks – Cloud Computing – Bigdata Analytics – Communication protocols – Embedded Systems. IoT Levels & Deployment Templates.	**K1**	**10**
III	Domain Specific IoTs: Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle. IoT and M2M- M2M, Differences between IoT and M2M, SDN and NFV for IoT.	**K3 K4**	**10**
IV	IoT Platforms Design Methodology: Introduction - IoT Design Methodology. Case Study on IoT System for Weather Monitoring.	**K5**	**10**
V	IoT Systems - Logical Design Using Python**:** Introduction – Installing Python – Python Data Types & Data Structures: Control Flow - Functions – Modules – Packages - File Handling - Date / Time Operations - Classes.	**K5 K6**	**10**

Learning Resources	
Text Books	1. Arshdeep Bahga and Vijay Madisetti, “Internet of Things - A Hands-on Approach”, Universities Press, 2015.
Reference Books	1. Samuel Greengard, “The Internet of Things” 2. Cuno Pfister, “Getting started with Internet of Things”
Web site Reference	1. https://wwkw.tutorialspoint.com/internet_of_things/ 2. https://www.guru99.com/iot-tutorial.html 3. http://www.steves-internet-guide.com/internet-of-things/

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	
CO2	✓	✓		
CO3			✓	
CO4	✓			
CO5		✓		✓

Semester	III	PRACTICAL: III	Credit	5
Code	20U3CACP03	RDBMS Lab	Hours	5

COURSE OBJECTIVE

To enable the students to learn the database system Relational Algebra and Calculus, Normal Forms, Parallel and Distributed System

COURSE OUTCOMES

CO1	**K1**	Design Algorithms for the given Problem Specifications.
CO2	**K1 K2**	Working with Data Manipulation of Records
CO3	**K2 K3**	Creating Tables and accessing data using Queries
CO4	**K3 K4**	Creating and Accessing tables using PL/SQL
CO5	**K4 K5**	Creating and Accessing tables using procedures

LIST OF PROGRAMS:

1. Table Creation
   i) Create the table with the following attribute
   Table Name: Employee
   Attributes: Eno (PK), Ename, Dept, Design, Salary, Phone Number
   ii) Alter the table employee, add the column age, community.
2. Data Manipulation
   i) Insert the values to the above table
   ii) Display the employee names who is working as “Lecturer”
   iii) Display the table in ascending order
   iv) Update the table employee; add 20% Bonus to each employee
   Queries
   v) Select ename from employee table such that salary greater than 8000.
   vi) Select Eno, Ename from employee whose salary between 6000 and 15000.
   vii) Create a view tick from employee with Ename, Phone, and Department.
3. Simple queries using built in functions
4. Simple queries using set operations

PL/SQL

5. a) Creation of student information records containing Reg.No, Name, Subject Code, Marks, Course and Grade.
   b) Find the Total and average for each student table.
   c) Record Manipulations such as deletion, Modification, Addition and Counting the record.
6. Writing a PL/SQL Program to find the total amount based on rules similar to the following
   i) If UNIT <= 100 then Price is free scheme
   ii) If UNIT >100 and <= 200 then Price is Rs. 2.50 / UNIT.

iii) If UNIT > 200 and <=500 then Price is Rs. 3.00/Unit.

7. Write a PL/SQL block to count the number of students in each department. If the count value is greater than 60 in each department, then transfer the excess records into another table department wise. Use exception handler to handle this routine.
8. Write a database trigger to implement the concept of Master Detail Relationship.
9. PL/SQL procedure to design Pay Bill.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓
CO2			✓	
CO3	✓	✓		✓
CO4	✓			✓

« SEMESTER – IV »

Semester	IV	CORE VII	Credit	4
Code	20U4CAC07	SOFTWARE ENGINEERING	Hours	5

COURSE OBJECTIVE

To inculcate knowledge on Software engineering concepts in turn gives a roadmap to design a new software project.

COURSE OUTCOMES

CO1	**K1 K2**	Understanding the basic concepts of Software Engineering.
CO2	**K1 K2 K3**	To Understanding about the various process models and Agile development.
CO3	**K1 K2 K3 K4**	Able to understand about the principles in software engineering and requirements.
CO4	**K3 K4**	Understanding clearly about the new methodologies used in modeling.
CO5	**K3 K4 K5**	To easy recognize and find the way for Designing Models.

Unit	Syllabus Contents	Levels	Number of Sessions
I	Software and Software Engineering: The nature of software – Software Engineering-software process-software engineering practice-software myths	**K1**	**10**
II	Process Models: Generic process models-prescriptive process models-specialized process models-unified process. Agile Development: Agile process-Extreme programming-Agile process models-	**K1 K2**	**10**
III	Principles that guide Practice: core principles - Framework activity. Understanding Requirements: Requirements Engineering-Eliciting requirements.	**K3 K4**	**10**
IV	Requirement Modeling: Requirement Analysis-Scenario based modeling-Data modeling concepts-Class based modeling. –Flow oriented modeling-patterns for requirements modeling-requirements modeling for Web Apps.	**K4**	**10**
V	Design Concepts: Design concepts - Design model. Architectural Design**:** Software Architecture-Architectural styles-Architectural design. Component Level Design**:** Designing class based components-Designing Traditional components-component based development.	**K5**	**10**

Learning Resources	
Text Books	1. Roger S.Pressman, "Software Engineering A Practitioner's Approach"-Mc Graw Hill International, 7th Ed 2010.
Reference Books	1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach" - 6th Edition, Tata McGraw Hill International Edition. 2. "Fundamentals of Software Engineering" – Rajib Mall, 2nd edition, PHI 3. "Software Engineering" – Stephen Schach, 7th edition, TMH.
Web site Reference	1. https://www.tutorialspoint.com/software_engineering/ 2. https://www.geeksforgeeks.org/software-engineering/

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		
CO2		✓		✓
CO3	✓		✓	✓
CO4	✓			✓
CO5	✓		✓	✓

Semester	IV	Core: VIII	Credit	4
Code	20U4CAC08	VISUAL PROGRAMMING	Hours	5

COURSE OBJECTIVE

To build applications along the 'event driven paradigm' and allow the user to build simple and complex applications using available controls.

COURSE OUTCOMES

CO1	**K1 K2 K3**	Understanding the basic concept of Visual Basics and how to create an application.
CO2	**K1 K2 K3**	Working with IDE Forms and Controls, variables in Visual basics and provides a coding experience in Visual Basics.
CO3	**K1 K2 K3 K4**	Able to understand File Management functions, tools and methods used to build a menu for an application and to manage multiple forms under the MDI.
CO4	**K3 K4 K5**	Error Tracking, data storage in relational data base model, to create view and edit a simple program using data bound controls are explored.
CO5	**K3 K4 K5 K6**	Understanding report creation and building setup program.

UNIT	SYLLABUS CONTENTS	Level	No. OF SESSIONS
I	WELCOME TO VISUAL BASIC: What is Visual Basic – Features of Visual Basic - Visual Basic Editions – The Visual Basic Philosophy – Developing an Application? CREATING AN APPLICATION: Objectives – The Tool Box – Project Explorer – The Properties Window – The Form window – What does Visual Basic 6 have for you to create applications.	K1	10
II	IDE, Forms and Controls: Objectives – The Form – Working with the Properties Window – Working with a Control – Opening the Code Window. VARIABLES IN VISUAL BASIC: Objectives – What is Variable? WRITING CODE IN VISUAL BASIC: Objectives – The Code Window – The Anatomy of a Procedure – Editor Features.	K1 K2	10
III	WORKING WITH FILES: Objectives – Visual Basic File System Controls. Exercise – Types of Files – Working with Files – What is a Record – Opening a Sequential File – Closing File. MENUS: Objectives – Building the User Interface. The First Step – All About Menus. MULTIPLE DOCUMENT INTERFACE APPLICATIONS: Why MDI Forms – Features of an MDI Form.	K2 K3	10
IV	DEBUGGING TIPS: Objectives – What is a Bug. – Types of Bugs. INTRODUCTION TO DATABASES: Why databases – What is a database? – Which Database – Creating a Table. WORKING WITH THE DATA CONTROL: The Data Control – The Bound Controls – Coding. DATA ACCESS OBJECTS: The Jet Database Engine – Functions of Jet Database Engine – SQL – The DAO object Model – ActiveX Data Objects – Objectives – Why ADO.	K4	10

V	CRYSTAL AND DATA REPORTS: Crystal reports – Data Report. ActiveX: What is ActiveX? ActiveX AND WEB PAGES: ActiveX and Internet.	K5	10

LEARNING RESOURCES	
Text Book	1. Mohammed Azam "Programing with Visual Basic 6.0" Vicas Publishing House Pvt Ltd Reprint 2006.
Reference Books	1. Mastering Visual Basic 6" Evangelus Petroutsos BPB Puhlnata. 2. Gray Cornell, "VISUAL BASIC 6 from the GROUND UP", Tata McGraw Hill Edition, 1999.
Web site Reference	1. https://www.vbtutor.net/vbtutor.html 2. https://www.freetutes.com/learn-vb6/

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2		✓		✓
CO3	✓		✓	
CO4		✓		✓
CO5	✓		✓	

Semester	IV	CORE: IX	Credit	4
Code	20U4CAC09	**COMPUTER NETWORKS & SECURITY**	Hours	5

COURSE OBJECTIVE

- To understand the basics of Computer Networks.
- To understand the important OSI layers of computer Networks.
- Become familiar with the basics of computer network architectures and protocols.

COURSE OUTCOMES

CO1	**K1 K2 K3**	Able to differentiate between business and home applications and connection and connectionless services.
CO2	**K1 K2**	Provides complete information about the physical layer and their areas of application.
CO3	**K2 K3 K4**	Understanding data link layer and their functions in message delivering applications.
CO4	**K1K3 K4**	Exploring different network layer functions along with the algorithms to select the best one for communication.
CO5	**K4 K5**	To create a clear cut idea on transport, network security and application layers.

Unit	Syllabus Contents	Levels	No. of Sessions
I	**Introduction:** Business Applications - Home Applications – LAN – WAN- MAN- Protocol Hierarchies – Protocols and Standards- Connection Oriented and Connection less Services – OSI Reference Model.	**K1 K2 K3**	**10**
II	**Physical Layer** Transmission Media: Guided Transmission media - Wireless Transmission - Communication Satellites - Public Switched Telephone Network.	**K1 K2**	**10**
III	**Data Link Layer:** Data Link Layer Design Issues - Error Detection and Correction – Elementary data link protocols - Sliding Window Protocols - Protocols Verification.	**K2 K3 K4**	**10**
IV	**Network Layer:** Network Layer Design Issues. Routing Algorithms: Shortest Path-LinkState – Distance Vector. Congestion Control Algorithms: Principles – Load Shedding. Internetworking: Tunneling – Fragmentation – IP Addresses – Protocols – OSPF.	**K1 K3 K4**	**10**
V	**Transport Layer:** Transport Services – Elements of Transport protocols – **Application layer:** DNS– Electronic mail-World Wide Web. **Network Security:** Cryptography-Symmetric and Public-key algorithms-Digital signatures.	**K3 K4 K5**	**10**

Learning Resources

Text Books	1. Andrew S. Tanenbaum, "Computer Networks" 5th Ed, PHI private Ltd, 2009.
Reference Books	1. Behrouz A. Forouzan, "Data Communication and Networking", TMH, 2009.
Website Reference	1. https://stevessmarthomeguide.com/basic-networking-course/ 2. https://www.studytonight.com/computer-networks/

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2	✓			✓
CO3		✓	✓	
CO4	✓			✓
CO5		✓	✓	✓

Semester	IV	PRACTICAL: IV	Credit	4
Code	20U4CACP04	VISUAL PROGRAMMING LAB	Hours	5

COURSE OBJECTIVE

- To obtain knowledge in creating an application using Visual Basic.
- To apply real time problems using Visual Basic Programming concept

COURSE OUTCOMES

CO1	**K1**	Design algorithms for the given problem specifications.
CO2	**K1 K2**	Write Visual Basic programs for the designed algorithm specification.
CO3	**K1 K2 K3**	Write Visual Basic programs to implement controls
CO4	**K1 K2K5**	Write Visual Basic programs to implement Files And Database..
CO5	**K4 K5 K6**	Design a Simple Application Using Visual Basic Codings.

List of Experiments:

1. Create a form to change the background color of a form.
2. Write a VB program accept two strings in two text boxes and concatenate them and display in a single label box.
3. Design a form to print the prime numbers.
4. Create a form to change the font size using timer control.
5. Create a VB program to add and remove the items in the list box using add item and remove item methods.
6. Write a VB program to add and read the data in a sequential file.
7. Construction of an Arithmetic Calculator (Simple).
8. Preparation of Students Mark Sheet. (using database)
9. Personal Information System (Using database and create data report)
10. Write a VB program to display the employee details in the form using Active X Data Control.

MAPPING WITH PROGRAM OUTCOMES

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2		✓		✓
CO3				✓
CO4		✓	✓	
CO5			✓	✓

Semester	IV	SBEC: II	Credit	2
Code	20U4CAS02	DTP PACKAGE	Hours	2

COURSE OBJECTIVE

- Describe the platforms upon which Photoshop is performed.
- Create a simple application so that editing is performed.
- Deals with the learning of editing images using Photoshop.

COURSE OUTCOMES

CO1	**K1 K2**	Understanding about system essentials and File format essentials.
CO2	**K2 K4**	Provides complete information about Toolbox and Palette Essentials and about selecting tools for editing images.
CO3	**K3 K5**	Improves the ability to edit images by knowing about drawing tools and editing tools.
CO4	**K3 K4**	Exploring about color essentials and different manipulation layers.
CO5	**K5**	Create and edit an image using recognized tools

Unit	Syllabus Contents	Knowledge Level	No. of Sessions
I	**Introduction:** Choosing the printing house, Fonts – Hardware Requirement for DTP – General Design Consideration – Text Organization – Design Common Media Publication.	**K1 K2**	**5**
II	**Pagemaker:** Getting Started with PageMaker – Working in PageMaker – The PageMaker window – Working with text – Multiple Text Block. **Editing text:** Making changing in the Publication – Searching by Format – Replacing the Text.	**K2**	**5**
III	**Formatting Text:** Changing the Font Size – Making the text bold – Removing Boldface from the text – Underlining the text – Aligning the text.	**K3**	**5**
IV	**Photoshop CS2:** Introduction and Launching Photoshop CS2 – Exploring the New Interface – Photoshop Tools – **Working with Images:** Editing Images – Color Modes.	**K2**	**5**
V	**Making Selections:** Making selection-Moving a Portion of an Image – Editing Selections - Filling a selection –Transforming selection-Painting.	**K3 K4**	**5**

Learning Resources	
Text Books	1. Vikas Gupta, "Comdex DTP Course Kit" Dreamtech Publishers-New Delhi, 2008
Reference Books	Shirish Chavan, "Rapidex Dtp Course Book", Desktop Publishing.
Web Sites	http://photopagetutorial-biplab.blogspot.in/p/pagemaker-tutorial.html http://www.cyber-tech.in/pagemaker-tutorial.html http://www.photoshoptutorials.ws/ http://www.photoshop.com/tutorials

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓			✓
CO3		✓	✓	
CO4	✓			✓
CO5		✓	✓	✓

« SEMESTER – V »

Semester	V	Core: X	Credit	4
Code	20U5CAC10	**JAVA PROGRAMMING**	Hours	5

COURSE OBJECTIVE

To enable the students to learn the database system Relational algebra and calculus, normal forms, parallel and distributed system.

COURSE OUTCOMES

CO1	**K1 K2**	Understanding Simple Java Programming and basic needs
CO2	**K1 K3**	Identify Classes, Objects, Constructors and Arrays in Java Programming
CO3	**K2 K3**	Achieve code reusability and extensibility by means of Inheritance and Polymorphism.
CO4	**K4 K5**	Understand the complexity of Industrial Strength Software and the application of Unified Process Model.

UNIT	SYLLABUS CONTENTS	Levels	No. OF SESSIONS
I	**Overview of Java Language:** Introduction – simple java program-Java program structure-Java Tokens-Implementing a Java program Constants, variables, Data Types and Operators: Constants-variables-Data Types-Declaration of variables-Operators and Expression.	K1	12
II	**Classes, objects and Methods:** Defining a classes – Field and method declaration – creating objects – constructors – methods overloading – static members – Abstract class. Array: Introduction – One Dimensional Array-Creating Array-Two dimensional Array	K2 K3	12
III	**Inheritance:** Extending a class – Overriding methods. Interfaces: Defining Interface – Extending Interface. Packages: Java API package – creating package – Accessing Package	K3 K4	12
IV	**Applet Programming:** Building Applet Code – Applet Life Cycle – Designing a web page – Applet Tag – Running the Applet. Graphics Programming: The Graphics Class – Lines and Rectangle-Drawing Arcs – Drawing Polygons – Line Graphics	K4	12
V	**Multithreaded Programming**: Introduction – Creating Thread – Extending the Thread Class – Life cycle of the Thread – Thread Exception – Thread Priority.	K5	12

LEARNING RESOURCES	
Text Book	1. Balagurusamy, "Programming in Java", 4th Edition 2010, TMH, New Delhi.
Reference Books	1. Herbert Scheldt, "Java2 The complete Reference" -McGraw Hill Publication 2. John R. Hubbard, "Programming With Java", 2nd Edition, TMH.
Website Reference	1. https://www.edureka.co/blog/java-tutorial/ 2. https://www.javatpoint.com/java-applet

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	
CO2	✓	✓		✓
CO3		✓	✓	
CO4			✓	✓

Semester	V	Core: XI	Credit	4
Code	20U5CAC11	PHP PROGRAMMING	Hours	5

COURSE OBJECTIVE

To highlight all features of PHP Programming and apply it to develop various websites & applications

COURSE OUTCOMES

CO1	**K1 K2 K3**	Understand the concepts of PHP programming language with Basics & Control Structures
CO2	**K2 K3**	Working PHP With MySQL
CO3	**K1 K2**	Understand the concepts of Functions & Arrays
CO4	**K1 K2 K3 K4**	Applying the concepts of Object Oriented PHP, Error and Exception Handling in PHP Programming
CO5	**K3 K4**	Explore the concepts Strings and Regular Expression, Design the Web Form

UNIT	SYLLABUS CONTENTS	LEVELS	No. OF SESSIONS
I	**Introduction to PHP:** History - General Language Features – PHP Basics: Embedding PHP Code in your Web Pages - Commanding Your Code - Output Data to the Browser. PHP's Supported Data Types- Identifiers – Variables – Constants – Expressions –String – Interpolation. **Control Structures:** Conditional Statements - Looping Statements - File Inclusion Statements	**K1 K2 K3**	12
II	**Introduction to MySQL:** Naming Database Elements-Choosing Your Column Types- Choosing other Column Properties-Accessing MySQL. **Using PHP With MySQL** Modifying The Template - Connecting To MySQL - Executing Simple Queries - Retrieving Query Results -Ensuring Secure SQL-Counting Returned Records- Updating Records With PHP.	**K1 K2 K3**	12
III	**Functions**: Invoking Function – Creating a Function - Function Libraries. **Arrays:** Creating an Array - Adding and Removing Array Elements – Locating Array Elements - Traversing Array – Merging – Slicing – Splicing and Dissecting Array.	**K2 K4**	12
IV	**Error and Exception Handling-** Configuration Directives-Error Logging-Exception Handling. **Strings and Regular Expression:** Other String Specific Function - Alternatives for Regular Expression Functions**.**	**K1 K2 K3 K4**	12
V	**Forms:** PHP and Web Forms-Taking Advantage of Pear: HTML_QuickForm-Installimg HTML_QuickForm-Creating a Simple Form- Using Auto-Completion. **Authentication:** HTTP Authentication Concepts – PHP Authentications: Authentication Variables – Useful Functions.	**K1 K2 K3 K4**	12

LEARNING RESOURCES	
Text Book	1. "Beginning PHP and Oracle From Novoice to professional" W.Jason Gilmore and Bob Brylr edition – 2008 2. "PHP 6 and my SQL 5 " Larry Ullman -2008(chapter 4 & 8)
Reference Books	1. "Spring into PH5 the Small Professional choice" Steven Holzner, Pearson education, Edition: First Impression 2006. 2. "PHP and my SQL for dynamic websites" – Larry Ullam-fourth edition 2015 3. "PHP 6 and my SQL ": bible – Steve Suehring, Tim converse, Joy Park -2009

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2		✓		
CO3	✓		✓	
CO4		✓	✓	✓
CO5				✓

Semester	V	PRACTICAL: V	Credit	3
Code	20U5CACP05	**JAVA PROGRAMMING LAB**	Hours	5

COURSE OBJECTIVE

To enable the students to learn the database system Relational Algebra and Calculus, Normal Forms, Parallel and Distributed System

COURSE OUTCOMES

CO1	**K1**	Learn the basic concepts& techniques of java.
CO2	**K1 K2**	Learn OOPs Concepts through Java Programs.
CO3	**K1 K2 K3**	Create and windows & its components using Java Coding
CO4	**K3 K4**	Adding Menu bars and various shapes in Java Environment.
CO5	**K4 K5**	Execute the Java files using Java coding

LIST OF PROGRAMS:

1. Write a Java Applications to extract a portion of a character string and print the extracted string.
2. Write a Java Program to implement the concept of multiple inheritance using Interfaces.
3. Write a Java Program to create an Exception called payout-of-bounds and throw the exception.
4. Write a Java Program to draw several shapes in the created windows.
5. Write a Java Program to create a frame with four text fields name, street, city and pin ode with suitable tables. Also add a button called “my details”, When the button is clicked its corresponding values are to be appeared in the text fields.
6. Write a Java Program to demonstrate the Multiple Selection List-box.
7. Write a Java Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address
8. Write a Java Program to create Menu Bars and pull down menus.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓
CO2	✓	✓	✓	✓
CO3			✓	
CO4	✓	✓	✓	

Semester	V	PRACTICAL – VI	Credit	3
Code	20U5CACP06	PHP PROGRAMMING LAB	Hours	4

COURSE OBJECTIVE

To develop applications in PHP using various concepts like to establish the connectivity between PHP and MySQL and develop programs to add records, retrieve records and delete records from a table.

COURSE OUTCOMES

CO1	**K1**	Design algorithms for the given problem specifications.
CO2	**K1 K2**	Write VB .Net programs for the designed algorithm specification.
CO3	**K1 K2 K3**	Write VB .Net programs to implement controls
CO4	**K1 K2**	Write VB .Net programs to implement Files.

LIST OF PRACTICALS

1. Develop PHP program using the following
   a. Use of conditional statements in PHP
   b. Use of looping statements in PHP
   c. Use of different types of arrays
2. Write a PHP program to prepare the student marks list.
3. Create a PHP Program to find odd or even number from given numbers.
4. Write a PHP Program to demonstrate the variable function
   a. Gettype() b) Settype()
5. Give the example of String function
   a. Substr(); b) Strcmp()
6. Write a PHP Program that demonstrates Form element input elements.
7. Database connectivity in PHP with MySQL
8. To create a table and do all the DDL commands using PHP Programming
9. Develop a PHP program to display student information using MYSQL table.
10. Creating simple webpage using PHP

MAPPING WITH PROGRAM OUTCOMES

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2	✓	✓		
CO3			✓	✓
CO4		✓		

Semester	V	CORE:XII MOBILE APPLICATION DEVELOPMENT	Credit	3
Code	20U5CAC12		Hours	4

COURSE OBJECTIVE

- To understand the concept of Android Technology.
- To understand applications of android.
- To understand android web apps.

COURSE OUTCOMES

CO1	**K1 K2**	Learning Basics and History of Mobile Software Development
CO2	**K2 K3**	Applying Application Design Essentials
CO3	**K1 K2 K3 K4**	Analyzing tools using to develop Android Apps
CO4	**K1 K2 K3 K4**	Linking Database with Apps

UNIT	SYLLABUS CONTENTS	LEVELS	No. OF SESSIONS
I	Introduction to Android: Introducing Android-History of Mobile Software Development - Open Handset Alliance - The Android Platform - Layers of Android-Android SDK - Kinds of Android Components.	**K1 K2**	10
II	Android Application Design Essentials: Anatomy of an Android Applications – Android Terminology - Application Context - Actives – Services – Intents - Receiving and Broadcasting Intents. Lifecycle of the android applications.	**K2 K3**	10
III	Android Application Design Essentials: User Interface Screen Elements - Designing User Interfaces with Layouts - Drawing and Working with Animation. Android Emulator - Creating AVD	**K2 K4**	10
IV	Using Common Android APIs: Using Android Data and Storage APIs- Managing data using SQLite - Sharing Data between Applications with Content Providers.	**K3 K4**	10
V	DDMS - Debug and Other View: DDMS - Dalvik Debug Monitor Server - LogCat View.	**K3 K4 K5**	10

LEARNING RESOURCES	
Text Book:	1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd Ed, 2011. 2. W. Frank Ableson, Robi Sen, Chris King, "Android in Action", 2nd Ed, Manning Publications Co., 2011.
Reference Books:	1. Chris Haseman, "Android Essentials", Apress Publications, 2008. 2. James Steele, Nelson To, "The Android Developer's Cookbook-Building Applications with the Android SDK", Addison-Wesley Publications, 2011.
Web Site References	**1.** https://www.cs.cmu.edu/~bam/uicourse/830spring09/BFeiginMobileApplicationDevelopment.pdf **2.** http://www3.ul.ie/ictlc/Android.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓			
CO3	✓		✓	✓
CO4		✓		

Semester	V	SBEC: III	Credit	2
Code	20U5CAS03	**SOFT SKILLS**	Hours	2

COURSE OBJECTIVE

- To enable students to build a repositories of functional vocabulary and to move from the lexical level to the syntactic level.
- To train students to summon words, phrases relevant to the immediate communication tasks.
- To enable students to comprehend the concept of communication.

COURSE OUTCOMES

CO1	**K1 K2**	To develop communication skills and to know about the stages of communication.
CO2	**K1**	To Understanding about the listening and speech process.
CO3	**K3 K4**	Able to know how to face the interview and to prepare for the interview.
CO4	**K5**	Making to discuss a topic with friends or classmates helps in learning the topic with perfection. It involves sharing of learning by the participants which equally benefits all the participants.
CO5	**K5 K6**	To provide an opportunity to make it easier to engage the audience, Flexibility, Consistency and Versatility.

Unit	Syllabus Contents	Levels	No.of Sessions
I	**Nature of technical communication**: Communication as sharing – Stages of communication – Channels of communication – Nature of technical communication – Importance and need for technical communication – Technical communication skills.	**K1 K2**	**5**
II	**The Listening process**: Types of listening – Listening with a purpose – Barriers to listening –The speech process – Conversation and oral skills –Strategies for good conversation – Improving fluency and self-expression – Body language.	**K1**	**5**
III	**Job interviews**: Interview process – Characteristics of job interview– Pre-interview preparation techniques – Interview questions – Answering strategies – Frequently asked interview questions – Projecting a positive image – Alternative interview formats.	**K3 K4**	**5**
IV	**Group Discussion**: Nature of group discussion – Characteristics of successful group discussions – Selection group discussion – Group discussion strategies – Techniques for individual contribution – Group interaction strategies.	**K5**	**5**
V	**Presentation Skills**: Nature and importance of oral presentation – Planning the presentation – Preparing the presentation – Organizing your presentation – Rehearsing the presentation – Improving delivery.	**K5 K6**	**5**

Learning Resources	
Text Books	M. Ashraf Rizvi, "Effective Technical Communication" Tata McGraw – Hill Publishing Company Limited , New Delhi.Unit -I (Chapter-1), Unit-II(Chapter-4,6), Unit-III(Chapter-9), Unit-IV(Chapter-10), Unit-V(Chapter-11).
Reference Books	1.Monippally, Matthukutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw-Hill. New Delhi 2.Sasikumar.V and P.V. Dhamija. "Spoken English: A Self-Learning Guide to Conversation Practice. ", 1993 34th Reprint. Tata McGraw-Hill. New Delhi.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		
CO2	✓	✓		
CO3			✓	✓
CO4			✓	✓
CO5		✓	✓	✓

Semester	V	Elective – I E - COMMERCE	Credit	4
Code	20U5CAE01		Hours	5

COURSE OBJECTIVE

- To understand the purpose and the value of Ecommerce.
- To apply the principles of business oriented teams in computer applications.
- To understand the security issues of Ecommerce.

COURSE OUTCOMES

CO1	**K1 K2**	To develop skills in electronic commerce and complete email services.
CO2	**K2K3**	To Understand about Internet services in detail.
CO3	**K1 K4**	Able to know how to apply electronic commerce skills in Internet services.
CO4	**K1 K2 K4**	Explores about issues faced by internet services especially legal issues.
CO5	**K1 K3 K5**	To provide an opportunity to make it easier to acquire knowledge about security Issues.

Unit	Syllabus Contents	Levels	No. of Sessions
I	**Electronic commerce:** Electronic Commerce - Electronic Data Interchange - Value Added Networks - Electronic Commerce over the internet – Commerce Net. PCs and Networking: Networking - Communication Media. Electronic Mail: Computer communication system ISO's Open System Interconnection model – Electronic Mail - The X.400 message handling system - internet mail - Email security - X.500 directory services - Mail user agent.	**K1 K2**	**12**
II	**The Internet:** A Brief Introduction- Internet Communication Protocols- Internet Services and Resources - Internet Mail - Internet Search - Concerns About - The Internet –Browsers - Hypertext Markup Language - Java - The Java Electronic Commerce Framework - Internet 2. Intranets: Intranet Services - Intranet Implementation -The Webmaster. Electronic Data Interchange: Electronic Data Interchange Costs and Benefits –Components of EDI Systems EDI Implementation Issues - Legal Aspects.	**K2 K3**	**12**
III	**The UN/EDIFACT Standard:** Introduction - An EDIFACT Message - Interchange structure –UN/EDIFACT Message Directories. The Internet and Extranets for Electronic Commerce: E-Commerce - Commerce over The Internet - Commerce Over Extranets. Identification and Tracking Tools for Electronic Commerce: The EAN System - EANCOM - Article Numbering - Bar Coding. The serial shipping container code and the EAN label - EAN Location Numbers.	**K1 K4**	**12**

IV	**Legal Issues:** Paper Documents Versus Electronic Document – Technology for Authenticating an Electronic Document - Laws for E-Commerce - EDI Interchange Agreement - Legal Issues for Internet Commerce. E-Commerce in India: EDI India. The Internet in India - Laws for E-Commerce in India.- webservers - Business - To-Business EC. Business Process Reengineering: Introduction –Approach to BPR Strategic Alignment Model BPR Methodology. Management of Change: Change Management in Public Administration The Implement Plan	**K1 K2 K4**	**12**
V	**Security Issues:** Security Concerns - Security solutions - Electronic Cash over the Internet –Security and UN/EDIFACT Message - Internet Security.	**K1 K3 K5**	**12**

Learning Resources	
Text Books	E-Commerce, The Cutting Edge of Business - Kamlesh K.Bajaj, Debjani Nag Second Edition Tata Mc-Graw- Hill (Chapter 2,3,4,5,6,7,8,9,10,13,14).
Reference Books	E-Commerce Strategy, Technologies and Applications David Whiteley Tata Mc-Graw- Hill.
Website links	https://www.pearsonhighered.com/samplechapter/0131735160.pdf https://florida.theorangegrove.org/og/file/29589c3c-8bcd-72c1-b2f2-37789232eb3c/1/Electronic_Commerce.pdf https://www.shopify.in/ecommerce-pdf.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓	✓		
CO3	✓		✓	✓
CO4		✓	✓	
CO5	✓	✓	✓	✓

Semester	V	Elective – I SOFTWARE QUALITY ASSURANCE	Credit	4
Code	20U5CAE02		Hours	5

COURSE OBJECTIVE

To Understand Product Life Cycle, Project Life Cycle, Software Configuration, Definitions and Terminology, Project Initiation, Quality Management, Project Management.

COURSE OUTCOMES

CO1	**K1 K2**	To get knowledge about ISO Standards.
CO2	**K2K3**	To know about quality of the products.
CO3	**K1 K4**	Can able to know about the cost fixation and project planning and Tracking.
CO4	**K1 K2 K4**	Getting an opportunity about software testing strategies.
CO5	**K1 K3 K5**	Explores the knowledge about Project Management.

Unit	Syllabus Contents	Levels	No. of Sessions
I	Introduction – Product Life cycle – Project life cycle models - Water fall model Prototyping model – RAD model – Spiral Model – Process Models –The ISO-9001 Model-The Capability Maturity Model-Metrics.	**K1 K2**	**12**
II	Software Configuration Management – Definitions and terminology The processes and activities – Configuration Audit – Metrics –Tools andAutomation- Software Quality Assurance – Define Quality – Quality Control and Assurance – SQA Analysts Functions - QA Tools – Organizational Structures – Profile of a successful SQA-Measures of SQA success.	**K2 K3**	**12**
III	Project Initiation – Project Planning and Tracking – What, Cost, When and How – Organizational Processes – Assigning Resources – Activities to specific to Project Tracking – Project Closure – When and How.	**K1 K4**	**12**
IV	Quality Management – Software Quality, Software Quality Dilemma - Achieving Software Quality – Software Testing Strategies – Strategic Approach - Test Stategies for Conventional Software and Object Oriented Software.	**K1 K2 K4**	**12**
V	Project Management -The People, The Product, The Process - Project Scheduling - Risk Management –Maintenance and Reengineering - Business Process Reengineering – Software Re Engineering – Reverse Engineering – Restructuring - Forward Engineering.	**K1 K3 K5**	**12**

Learning Resources	
Text Books	1. Gopalaswamy Ramesh, "Managing Globle Software Projects" Tata McGraw Hill.Publishing Company Ltd, New Delhi, 2002. (Unit-I :Chapter 1,2,3,4&5, Unit-II: Chapter 6,7, Unit-III: Chapter 10,11 & 12) 2. Pressman, Roger, "Software Engineering ", A Practitioner's approach, 7th edition, Tata Mc- Graw Hill, 2006. 6th Edition (Unit-IV: Chapter 25, 26, Unit-V: 21, 31)
Referenc e Books	1. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", Mass Market, 2004. 2. Bob Hughes and Mike Cotterell "Software Project Management" 2nd Edition, TataMcGraw Hill Publishing Company Ltd., New Delhi, 2002. 3. "Software Project Management", Ashfaque Ahmed 2013.
Website links	**1.** http://www.cs.toronto.edu/~yijun/csc408h/handouts/lecture5.pdf **2.** https://www.vidyarthiplus.com/vp/thread-23085.html#.WUSxK9R97Dc **3.** https://www.slideshare.net/abasit83/software-quality-assurance-lecture-1 **4.** http://www.academia.edu/9760547/LECTURE_NOTES_2_Software_Quality_Assurance **5.** http://www.inf.ed.ac.uk/teaching/courses/seoc/2006_2007/notes/LectureNote20_SoftwareQuality.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓	✓		
CO3	✓		✓	✓
CO4		✓	✓	
CO5	✓	✓	✓	✓

Semester	V	ELECTIVE I SOFTWARE TESTING	Credit	4
Code	30U5CAE03		Hours	5

COURSE OBJECTIVE

To residual risk after testing the software to an acceptable level. Testing provides verification, Validation and Automation tools.

COURSE OUTCOMES

CO1	**K1 K2**	Understanding the basic concepts of Software Testing Strategies.
CO2	**K1 K2 K3**	To know about the Tools used for testing and should not be confused with automation products.
CO3	**K1 K2 K3 K4**	Able to understand about code review and desk debugging techniques that reduce the burden on dynamic code testing.
CO4	**K3 K4 K5**	Understanding clearly about the new methodologies and processes are emerging to improve software quality.

Unit	Syllabus Contents	Levels	No. of Sessions
I	Building a Software Testing Strategy – Software Testing Design Techniques.	**K1**	**12**
II	Software Testing Tools and Selection of Test Automation Products - Software Testing Lifecycle and Software Testing Process. Testing Effort Estimation and Test Planning.	**K1 K2**	**12**
III	Software Test Effort Estimation Technique - Pre-Development Testing Requirements and Design Phase – Best Practices in Program Phase Unit, System and Integration Testing.	**K2 K4**	**12**
IV	A Case Study on Acceptance Testing – Implementation an Effective Test Management Process – Building an Effective Test Organization..	**K4**	**12**
V	Testing in Today's Business and Usability – Testing of Web – Based Applications	**K5 K6**	**12**

Learning Resources	
Text Books	**1."Software Testing Effective Methods, Tools and Techniques"** by Renu Rajani and Pradeep Oak, Tata McGraw-Hill, 9th Reprint 2009.
Reference Books	**1."Software Testing Principles and Practices"** by Srinivasan Desikan & Gopalaswamy Ramesh, Pearson Education, Sixth Impression, 2008.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2		✓	✓	
CO3		✓		✓
CO4	✓	✓		

« SEMESTER – VI »

Semester	VI	CORE: XIII COMPUTER GRAPHICS	Credit	4
Code	20U6CAC13		Hours	5

COURSE OBJECTIVE

The goal of this course is to provide an introduction to the theory and practice of computer graphics. The course will assume a good background in programming in C or C++ and a background in mathematics including familiarity with the theory and use of coordinate geometry and of linear algebra.

COURSE OUTCOMES

CO1	**K1 K2 K4**	Understanding the basic concepts of Computer Graphics and generating algorithms.
CO2	**K1 K4 K5**	Exploring the different attributes types along with the basic transformations.
CO3	**K2 K3 K5**	Able to understand about the principles of 2D Viewing concepts along with the various clipping levels.
CO4	**K3 K4**	To easy recognize and find the way for Designing Models.
CO5	**K3 K4 K5**	To create an significance in Animation process.

Unit	Syllabus Contents	Levels	No. of Sessions
I	Introduction to Computer Graphics-GUI-Video Display Devices - Raster and Random scan displays-Input Devices-Hard Copy Devices-Line Drawing Algorithm-DDA Algorithm-Line Function – Circle Generating Algorithm.	**K1 K2 K4**	**12**
II	Line Attributes-Curve Attributes-Color and Gray Scale Levels-Area Fill Attributes-Character Attributes-Bundled Attributes-Basic Transformations-Matrix Representations-Composite Transformation-Translation-Rotation-Scaling-Reflection and Shear.	**K1 K4 K5**	**12**
III	3D Transformations-Viewing Pipeline- Viewing Functions-Point Clipping and Line Clipping-Cohen Sutherland Line Clipping-Polygon Clipping – Sutherland –Hodgeman Clipping-Curve and Text Clipping-Exterior Clipping.	**K2 K3 K5**	**12**
IV	Basic Modeling Concepts-Input of Graphical Data-Input Functions - Interactive Picture Construction Techniques.	**K3 K4**	**12**
V	3D Display Methods - Depth Buffer Method- A Buffer Method - Visible –Surface Detection Methods - Scan Line Method- Color Models- Xyz, RGB-YIQ CMY Color Models.	**K4 K5**	**12**

Learning Resources	
Text Books	1 Computer Graphics"- Donald Hearn and M. Puelin Baker- 2nd Ed. **2** "Multimedia Computing, Communications & Applications", Ralf Steinmetz & Klara Nahrstedt.
Reference Books	1. "Multimedia System Design", Prabhat K, Andleigh & Kiran Thakrar.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		
CO2		✓	✓	
CO3	✓			✓
CO4		✓		✓
CO5	✓		✓	

Semester	VI	Core: XIV COMPILER DESIGN	Credit	4
Code	20U6CAC14		Hours	5

COURSE OBJECTIVE

To introduce the concept of compiler with in detail coverage of basic tasks, metrics, issues, and implication. To introduce the concept of Syntactic specification of programming languages**.**

COURSE OUTCOMES

CO1	**K1 K2**	To develop skills in compiler basics and applications
CO2	**K1 K3**	To Understand about specifications of programming languages in detail.
CO3	**K2 K3**	Able to know how to apply syntax directed translation.
CO4	**K2 K4**	Explores about run time storage and phase errors.
CO5	**K3 K5**	To provide knowledge in code optimization and code generation.

Unit	Syllabus Contents	Levels	No. of Sessions
I	**Introduction to Compliers**: Compliers and Translator – Need of Translator – The structure of a Complier – Lexical analysis – Syntax analysis – Intermediate code generation – Optimization – Code generation – Complier writing tools. Finite automata and lexical Analysis: The role of the lexical analysis – A simple approach to the design of lexical analyzers- Regular expressions to finite automata – Minimizing the number of states of a DFA.	**K1 K2**	**12**
II	**The Syntactic specification of programming languages**: Context free grammars –Derivations and parse trees - Capabilities of context free grammars. Basic parsing techniques: Parsers – Shift reduce parsing – Operator precedence parsing – Top down parsing – Predictive parsers.	**K1 K3**	**12**
III	**Syntax directed translation**: Intermediate code – Postfix notation – Parse trees and syntax trees – 3 address code – Quadruples and triples –Boolean expressions – Statements that alter the flow of control. Symbol tables: The contents of a symbol table – Data structures for symbol table	**K2 K3**	**12**
IV	**Run time storage administration**: Implementation of a simple stack allocation scheme –Implementation of block - Error deduction and recovery: Errors – Lexical phase errors – Syntactic phase errors – Semantic errors.	**K1 K2 K4**	**12**
V	**Introduction of code optimization**: The principle sources of optimization – Loop optimization – The DAG representation of basic blocks. Code generation: Object programs – Problems in code generation–A simple code generator – Register allocation and assignment – Peepholes optimization	**K3 K5**	**12**

Learning Resources	
Text Books	Principles of Complier Design by Alfred V.Aho, Jeffrey D.Ullman , Narosa Publications House.
Reference Books	Modern Compiler Design by David Galles, Fifth Edition 2012.
Website links	http://www.w3schools.com/php/php_mysql_intro.asp. http://www.tutorialspoint.com/mysql/mysql-php-syntax.htm http://downloads.mysql.com/docs/apis-php-en.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓	✓		
CO3	✓		✓	✓
CO4		✓	✓	
CO5	✓	✓	✓	✓

Semester	VI	PRACTICAL – VIII	Credit	3
Code	20U6CACP08	COMPUTER GRAPHICS LAB	Hours	4

COURSE OBJECTIVE

COURSE OUTCOMES

CO1	**K1**	To get knowledge to draw the line and circle using DDA Algorithm.
CO2	**K1 K2**	To knows to view the objects as 2D Transformations and 3D Transformations.
CO3	**K1 K2 K3**	To get clear ideas about 3D other Transformations and viewing concepts.
CO4	**K1 K2**	To develop their practical skills about clipping operations.

List of Programs:

1. DDA Line Drawing Algorithm.
2. Circle Generating Algorithm.
3. 2D Translation Transformation.
4. 2D Rotation Transformation.
5. 2D Scaling Transformation.
6. 2D Other Transformations.
7. 3D Transformation.
8. 3D Other Transformations.
9. 3D Viewing Concepts.
10. Line Clipping Operations.
11. Curve Clipping Operations.

MAPPING WITH PROGRAM OUTCOMES

CO/PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓			✓
CO2	✓	✓		
CO3			✓	✓
CO4		✓		

Semester	VI	PROJECT PROJECT WORK (IN HOUSE PROJECT)	Credit	3
Code	20U6CACPR01		Hours	5

COURSE OBJECTIVE

- To acquire knowledge in developing skills.
- To implement real time problems using any Programming language.

COURSE OUTCOMES

CO1	**K1**	Designing an application for the given problem.
CO2	**K1 K2**	Writing coding for the designed application.
CO3	**K1 K2 K3**	Acquiring knowledge in industry leveldeveloping skills.
CO4	**K1 K2**	Getting familiar with project platform.
CO5	**K1 K4 K5**	Developing skills in Documentation and Presentation skills.

PROJECT WORK PATTERN

FIRST REVIEW: **(20 Marks)**

1. Project Title
2. Project Platform (Language / Package Selected)
3. Confirmation Letter (from Company / Industry)
4. Details of Internal Guide with Designation & Qualification (in the company / Industry/Organization).
5. Presentation

SECOND REVIEW: **(20 Marks)**

1. Work Observation
2. Modules in Project (Design Screens Sample)
3. DFD / ERD / System Flow Diagram (Whichever Applicable) 4.Estimated Time of Completion
4. Completed Work in the form of Percentage Analysis
5. PowerPoint Presentation.

FINAL REVIEW: **(60 Marks)**

1. Documentation
2. Screens Shots
3. DFD / ERD / System Flow Diagram (Whichever Applicable)
4. Final Project Report (with executable format including complete source code)

The Passing minimum shall be 40% out of 60 marks (24 Marks)

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	✓
CO2	✓	✓		✓
CO3		✓	✓	
CO4	✓		✓	
CO5	✓	✓		✓

Semester	VI	CORE:XV JAVASCRIPT	Credit	3
Code	20U6CAC15		Hours	4

COURSE OBJECTIVE

To learn about graphics and multimedia by practicing with drawing algorithms, animation and compression techniques

COURSE OUTCOMES

CO1	**K1 K2**	To develop skills in java script basics and statements.
CO2	**K2K3**	To Understand about utilization of variables, strings and arrays.
CO3	**K1 K4**	Able to know how to control flow with conditions and loops.
CO4	**K1 K2 K4**	Explores about JS forms validations and prototype.
CO5	**K1 K3 K5**	To provide an opportunity to know about JS functions and parameters.

Unit	Syllabus Contents	Levels	Number of Sessions
I	**Understanding JavaScript:** Learning Web Scripting Basics – How Java Script fits into a Web page - Browsers and JavaScript. Creating Simple Scripts : Tools for Scripting – Beginning the Script – Adding JavaScript Statements – Creating Output. Adding the script to web page- testing the script- getting started with java script Programming. Basic concepts – Java script Syntax Rules.	**K1 K2**	**10**
II	**Using Variables, String and Arrays:** Using Variables – Expressions and Operators - Data Types in JavaScript – String Objects – Using Numeric and String Arrays. Functions and Objects: Using Functions – Introducing Objects – Using Objects to simplify Scripting – Extending Built-in Objects. Converting, between data types - working with substring	**K2 K3**	**10**
III	**Controlling Flow with Conditions and Loops :** The if Statement – Using Shorthand Conditional Expressions – Testing Multiple Conditions with If and Else – Using Multiple Conditions with switch – Using for Loops – Using While Loops – Using Do . While Loops. Using Built-in Functions and Libraries: Using the Math Object – Working with Math Functions. Working with Loops- Looping Object Properties - sing with Keyword –Working with Dates.	**K1 K4**	**10**
IV	JS Objects-Object Definitions-Object Properties Object Methods Object Prototypes. Getting Data With Forms: The Basics Of HTML Forms-Using The Form Object With Javascript- Scripting Form Elements- Displaying Data From A Form – Sending Form Results By Email	**K1 K2 K4**	**10**

V	JS Functions-Function Definitions Function Parameters Function Closures. Working With Style Sheets: Style And Substance-Defining and Using CSS Styles – Using CSS Properties- Creating A Simple Style Sheets	**K1 K3 K5**	**10**

Learning Resources	
Text Books	Michael Moncur, "**Teach Yourself Java Script in 24 Hours".** Fourth Edition, published by Pearson Education.
Reference Books	**Java Script Design Patterns** . Addy Osmani, Beginner
Website links	http://www.tutorialspoint.com/javascript/javascript_tutorial.pdf http://cglab.ca/~morin/teaching/2405/notes/javascript1.pdf http://www.tarleton.edu/COSTWEB/computerscience/documents/CS%20230%20Documents/ Articles/JavaScript%20Tutorial.pdf http://notes.corewebprogramming.com/student/JavaScript.pdf

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓
CO2		✓		
CO3	✓		✓	✓
CO4		✓		
CO5	✓	✓	✓	✓

Semester	VI	SBEC: IV Designing Software - CorelDRAW	Credit	2
Code	20U6CAS04		Hours	2

COURSE OBJECTIVE

To learn about design techniques of corelDRAW and working with the Applications.

COURSE OUTCOMES

CO1	**K1 K2**	To understand CorelDraw concepts from scratch and explores the workspace of corelDraw
CO2	**K2K3**	To develop skills in working with lines and outline settings.
CO3	**K1 K4**	Able to know how the objects work and selecting color on objects.
CO4	**K1 K2 K4**	Explores about working with text such as font size and alignment.
CO5	**K1 K3 K5**	To provide an opportunity to understand the working with bitmaps (ie) importing and exporting the bitmaps.

Unit	Syllabus Contents	Levels	No.of Sessions
I	**Understanding corelDRAW-**graphics suite x4- corelDRAW-graphics suite applications-new and enhanced feature in corelDRAW-getting started with corelDRAW- exploring the workspace of corelDRAW.	**K1 K2**	**5**
II	**Working with lines-**Drawing a curve-drawing calligraphic lines-about outline tool-defining lines and outlines setting-creating a calligraphic outline-adding an arrowhead.	**K2 K3**	**5**
III	**Working with objects-**Selecting and deselecting objects-Deleting objects-sizing objects- combing objects-grouping in corelDRAW-grouping objects-ungrouping objects- applying convert to curve command on objects-selecting color on objects-filling objects-using fills-using pattern fills.	**K1 K4**	**5**
IV	**Working with text-**Types of text-preparing layout for using the text-creating artistic text- creating paragraph text- converting text from one type to another changing the appearance- font- font size - alignment-applying effects- drop cap- bulleted list-wrapping paragraph-converting text to an object-curve command-breaking part text.	**K1 K2 K4**	**5**
V	**Working with bitmaps-**Changing vector images to bitmap images – converting vector images to bitmap images- converting vector images to bitmap images when exporting –importing a bitmap into drawing-cropping-resembling and resizing-special effects to bitmaps.	**K1 K3 K5**	**5**

Learning Resources	
Text Books	"Comdex 9 in 1 DTP Course Kit", VIKAS GUPTA, Dream Tech Press
Reference Books	1. CorelDRAW X7 Users Guide", 2014 Coral Corporation. 2. "CorelDRAW: The basics Overview", SOLAR LASER SYSTEMS LTD
Website links	1. http://www.mr-dt.com/websiteprintablepdfs/howtousecoreldraw.pdf 2. http://product.corel.com/help/CorelDRAW/540229932/Main/EN/User-Guide/CorelDRAW-X7.pdf

	3. http://www.dcs.shef.ac.uk/intranet/teaching/public/projects/Poster%20Design%20-%20CorelDRAW.pdf 4. https://www.excard.com.my/PDF/help-tutorial/PDF-File-CDR.pdf 5. http://www.coreldraw.com/en/pages/800382.html

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓		✓	✓
CO2	✓	✓		✓
CO3		✓	✓	
CO4	✓		✓	
CO5	✓	✓		✓

Semester	VI	Elective – II DIGITAL IMAGE PROCESSING	Credit	4
Code	20U6CAE04		Hours	5

COURSE OBJECTIVE

To develop an overview of the field of image processing, understand the fundamental algorithms and how to implement them and concepts of Object Recognition, Image Data Compression.

COURSE OUTCOMES

CO1	**K1 K2**	To develop complete skills about fundamental steps in digital image processing and related concepts.
CO2	**K1 K4**	To understand complete knowledge in image processing and enhancements in spatial domain and frequency.
CO3	**K2 K3 K4**	Able to know how to restore images and processing color images
CO4	**K4 K5**	To know clearly about object recognition and pattern recognition.
CO5	**K5 K6**	To provide an opportunity to know about compression techniques especially image data compression.

Unit	Syllabus Contents	Levels	No. of Sessions
I	**Introduction:** What is Digital Image Processing? – Examples of Fields that Use Digital Image Processing – Fundamental Steps in Digital Image Processing – Components of an Image Processing System - Digital Image Fundamentals: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization– Some Basic Relationships between Pixels.	**K1 K2**	**12**
II	**Image Enhancement in the Spatial Domain:** Background. Some Basic Gray Level Transformations - Histogram Processing- Enhancement Using Arithmetic/Logic Operations- Basics of Spatial Filtering- Smoothing Spatial Filters. **Image Enhancement in the Frequency**: Background - Introduction to the Fourier Transform and the Frequency Domain- Smoothing Frequency-Domain Filters- Sharpening Frequency Domain Filters- Homomorphic Filtering- Implementation.	**K1 K4**	**12**
III	**Image Restoration**: A Model of the Image Degradation / Restoration Process- Noise Models- Restoration in the Presence of Noise Only– Spatial Filtering - Estimating the Degradation Function- Inverse Filtering- Minimum Mean Square Error (Wiener) Filtering. **Color Image Processing:** Color Fundamentals- Color Models- Pseudocolor Image Processing- Basics of Full-Color Image Processing- Color Transformations- Smoothing and Sharpening- Image Segmentation Based on Color.	**K2 K3 K4**	**12**
IV	**Object Recognition:** Knowledge Representation – Statistical Pattern Recognition – Neural Nets–Syntactic Pattern Recognition– Optimization Techniques – Fuzzy Systems–Mathematical Morphology – Basic Morphological Concepts – Binary Dilation and Erosion.	**K4 K5**	**12**
V	**Image Data Compression:** Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchal and Progressive	**K5 K6**	**12**

	Compression Methods – Comparison of Compression Methods – Coding – JPEG and MPEG Image Compression - Texture.		

Learning Resources	
Text Books	Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Prentice Hall, Third Edition, 2008. (Unit I to III :Chapter-1,2,3,4,5&6) Sonka, Hlavac, Boyle, "Digital Image Processing and Computer Vision", Cengage Learning, Fourth Indian Reprint 2011. (Unit-IV: Chapters: 9&13, Unit-V:Chapters:14&15)
Reference Books	Anil.K.Jain, "Fundamentals of Digital Image Processing", Prentice Hall,1989. Chanda & Majumdar, "Digital Image Processing and Analysis", Prentice Hall 3rdEdition.Practice. ", 1993 34th Reprint. Tata McGraw-Hill. NewDelhi.
Website Links	http://www.nprcet.org/ece/document/DIP.pdf https://web.cs.wpi.edu/~emmanuel/courses/cs545/S14/slides/lecture01.pdf http://www.eng.tau.ac.il/~yaro/lectnotes/pdf/L0_Introduction.PDF

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓
CO2	✓	✓	✓	
CO3				✓
CO4	✓	✓	✓	
CO5	✓		✓	✓

Semester	VI	ELECTIVE: II **BIG DATA ANALYTICS**	Credit	4
Code	20U6CAE05		Hours	5

COURSE OBJECTIVE

- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, NoSql and Map Reduce.
- To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To enable students to have skills that will help them to solve complex real-world problems in for decision support.

COURSE OUTCOMES

CO1	**K1 K2 K3**	Provides an overview of Big Data structure characteristics and functions.
CO2	**K1 K2**	Understanding hadoop Framework with HDFS concepts.
CO3	**K2 K4 K5**	Exploring different data analysis and cluster analysis methods.
CO4	**K3 K4**	Able to understand stream data model with data mining concepts.
CO5	**K1 K4 K5**	Introduces tools to analyze big data like Hadoop, NoSql and HiveQL Queries.

Unit	Syllabus Contents	Levels	No. of Sessions
I	Introduction to Big Data: Big Data –Definition, Characteristic Features –Big Data Applications - Big Data vs. Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Processes, Tools and methods - Modern Data Analytic Tools.	**K1 K2 K3**	**12**
II	**HADOOP FRAMEWORK:** Distributed File Systems - Large-Scale File System Organization –HDFS concepts – Map Reduce Execution, Algorithms using Map Reduce, Matrix – Hadoop YARN	**K1 K2**	**12**
III	**DATA ANALYSIS** : Statistical Methods: Regression modeling, Multivariate Analysis - Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Types of Data in Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Predictive Analytics –Data analysis using R.	**K2 K4 K5**	**12**
IV	**MINING DATA STREAMS**: Streams: Concepts –Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time - Real Time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.	**K3 K4**	**12**
V	**BIG DATA FRAMEWORKS**: Introduction to NoSQL –Aggregate	**K1 K4**	**12**

	Data Models –H base: Data Model and Implementations – H base Clients –Examples –.Cassandra: Data Model –Examples –Cassandra Clients –Hadoop Integration. Pig –Grunt –Pig Data Model –Pig Latin –developing and testing Pig Latin scripts. Hive –Data Types and File Formats –HiveQL Data Definition –HiveQL Data Manipulation	**K5**	

Learning Resources	
Text Books	1. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013.
Reference Books	1. Bill Franks, ―Taming the Big Data Tidal Wave: Streams with Advanced Analytics‖, Wiley and SA 2. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013. 3. Richard Cotton, "Learning R –A Step-by-step Function Guide to Data Media, 2013.

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓
CO2		✓	✓	
CO3			✓	✓
CO4	✓			✓
CO5	✓	✓	✓	

Semester	VI	Elective – II	Credit	4
Code	20U6CAE06	GRID COMPUTING	Hours	5

COURSE OBJECTIVE

- To understand the concept of grid computing
- To know the application of grid computing
- To understanding the technology and tool kits to facilitated the grid computing
- To know the Grid works on various tasks within a network, but it is also capable of working on specialized applications.

COURSE OUTCOMES

CO1	**K1**	To understand the concept of Grid activities and infrastructure
CO2	**K1 K2**	To learn Grid computing organization and their roles
CO3	**K3 K4**	Apply Grid computing applications.
CO4	**K1 K2**	Understand Grid computing technologies
CO5	**K3 K4**	Apply Grid computing tool kits in applications

Unit	Syllabus Contents	Levels	No. of Sessions
I	**GRID COMPUTING** : Introduction – Early and Current Grid activities – Grid Business areas – Grid Applications – Grid Infrastructure	**K1**	**12**
II	**GRID COMPUTING INITIALIVES:** Grid Computing Organizations and their Roles: Organization s developing Grid standards, best practice guidelines, Global grid forum (GGM), Grid Computing Toolkits and the frameworks – Grid based solutions to solve computing. Web Service Architecture – Grid Computing Anatomy: The Grid Problem.	**K1 K2**	**12**
III	**GRID COMPUTING APPLICATIONS**: Merging the Grid Services Architecture with the Web Devices Architecture: Service oriented Architecture – E-Web service, SOAP .Service message description Mechanisms – Relationship between web service and grid service.	**K3 K4**	**12**
IV	**GRID COMPUTING TECHNOLOGIES**: Merging the Grid Services Architecture with the Web Devices Architecture: Service oriented Architecture – E-Web service, SOAP .Service message description Mechanisms – Relationship between web service and grid service.	**K1 K2**	**12**
V	**GRID COMPUTING TOOL KITS**: Globus GT3 Toolkit – Architecture – Programming model, – A Sample implementation. Open Grid Service Infrastructure (OGSI): Introduction – Grid Services – High Level introduction to OGSI – Technical Details of OGSI Specification – Introduction to service Data Concepts.	**K3 K4**	**12**

Learning Resources	
Text Books	"Grid Computing", Joshy Joseph & Craig Fellenstein, PHI, 2nd Edition, 2013
Reference ooks	"Grid and Cloud Computing", D.Janakiram, TMH, 1st Edition, 2010
Website links	www.gridcomputing.com. www.redbooks.ibm.com

MAPPING WITH PROGRAM OUTCOMES

CO/ PSO	PSO1	PSO2	PSO3	PSO4
CO1		✓	✓	✓
CO2	✓	✓		
CO3			✓	✓
CO4	✓			
CO5	✓	✓	✓	✓