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**

DEPARTMENT OF COMPUTER APPLICATIONS

BCA

SYLLABUS & REGULATIONS

FOR CANDIDATES ADMITTED FROM 2017 – 2018
ONWARDS UNDER AUTONOMOUS & CBCS PATTERN

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

A U T O N O M O U S

VIVEKANANDHA COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)
BCA (COMPUTER APPLICATIONS)
(Candidates admitted from 2017-2018 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 - 10 Marks
2. Seminar - 5 Marks
3. Assignment - 5 Marks
4. Attendance - 5 Marks

Total - 25 Marks

Assessment Marks **for practical papers** will be as under:

1. Model Exam   - 20 Marks
2. Observation Note   - 10 Marks
3. Attendance   - 10 Marks

Total   - 40 Marks

PASSING MINIMUM (Theory)
EXTERNAL:

In the University Examinations, the passing minimum shall be 40 % out of 75 Marks. (30

Marks)

PASSING MINIMUM (Practical / Mini project)
EXTERNAL:

In the University 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:

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 and 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 without Distinction.

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 2017-18 (i.e.,) for the students who are to be admitted to the first year of the course during the academic year 2017-18 and thereafter.

XII. TRANSITORY PROVISIONS

Candidates who were admitted to the UG course of study before 2017-2018 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 2019-2020. 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: (10 x 2= 20)

Answer all the questions

Two Questions from each unit

PART- B: (5 x 5 = 25)

Answer all the questions

One Question from each unit (either or type)

PART- B: (3 x 10 = 30)

Answer any **THREE** of the questions

One Question from each unit (3 Out of 5)

The Passing minimum shall be 40% out of 75 Marks (30 Marks)

EVALUATION OF EXTERNAL EXAMINATIONS (EE)

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

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

BCA Curriculum for Academic year 2017 – 18

SEM	PART	COURSE CODE	TITLE	HOURS	CREDIT	MARKS		
						CIA	EE	TOTAL
I	I	17U1LT01	Tamil - I	4	3	25	75	100
	II	17U1LE01	English - I	4	3	25	75	100
	III	17U1MAA03	Allied - I- Paper -I Numerical Methods	4	4	25	75	100
	IV	17U1CAC01	Core - I Programming In C	5	4	25	75	100
	IV	17U1CACP01	Practical - I Programming in C Lab	4	3	40	60	100
	IV	17U1CAC02	Core - II Fundamentals of Computer Applications	5	4	25	75	100
		17U1VE01	Value Education	2	2	25	75	100
			Library	1	0	-	-	-
			Sports	1	0	-	-	-
			Total	**30**	**23**	**190**	**510**	**700**
II	I	17U2LT02	Tamil - II	4	3	25	75	100
	II	17U2LE02	English - II	4	3	25	75	100
	III	17U2MAA07	Allied -I Paper - II Discrete Mathematics	4	4	25	75	100
	IV	17U2CAC03	Core - III Object Oriented Programming with C++ and Object Oriented Systems	4	4	25	75	100
	IV	17U2CACP02	Practical - II Programming in C++ Lab	4	3	40	60	100
	IV	17U2CAC04	Core - IV Office Automation	4	4	25	75	100
		17U1ES01	Environmental studies	4	4	25	75	100
			Library	1	0	-	-	-
			Sports	1	0	-	-	-
			Total	**30**	**25**	**190**	**510**	**700**
III	III	17U3CMA03	Allied-II-Paper –I Financial Accounting	4	4	25	75	100
	IV	17U3CAC05	Core - V Data Structures and Algorithms	5	4	25	75	100
	IV	17U3CAC06	Core – VI Relational Data Base Management System	4	4	25	75	100
	IV	17U3CAC07	Core – VII Operating Systems	5	4	25	75	100
	IV	17U3CACP03	Practical - III RDBMS Lab	4	3	40	60	100
	VI	17U3MAN01	NMEC – I	2	2	25	75	100
	IV	17U3CAS01	SBEC – I Internet of Things	4	2	40	60	100
			Library	1	0	-	-	-
			Sports	1	0	-	-	-
			Total	**30**	**23**	**205**	**495**	**700**
IV	III	17U4CMA04	Allied - II - Paper -II Cost and Management Accounting	4	4	25	75	100
	IV	17U4CAC08	Core-VIII Software Engineering	5	4	25	75	100
	IV	17U4CAC09	Core-IX Visual Programming and VC++	4	4	25	75	100
	IV	17U4CAC10	Core-X Computer Networks and Security	5	4	25	75	100
	IV	17U4CACP04	Practical -V Visual Programming and VC++ Lab	4	3	40	60	100
	VI	17U4MAN02	NMEC – II	2	2	25	75	100
	IV	17U4CASP01	Practical -VI – Image Editing Programming - Photo shop	4	3	40	60	100
			Library	1	0	-	-	-
			Sports	1	0	-	-	-
			Total	**30**	**23**	**205**	**495**	**700**
V	III	17U5CAC11	Core: XI Java Programming	5	4	25	75	100
	III	17U5CAC12	Core: XII PHP Programming	5	4	25	75	100
	III	17U5CAE__	Elective – I	5	3	25	75	100
	III	17U5CACP06	Practical: VI Java Programming Lab	5	3	40	60	100
	III	17U5CACP07	Practical: VII PHP Programming Lab	4	3	40	60	100
	III	17U5CAC13	Core: XIII Mobile Application Development	4	3	25	75	100
	IV	17U5CAS03	SBEC: III Soft Skills	2	2	25	75	100
			Total	**30**	**22**	**205**	**495**	**700**
VI	III	17U6CAC14	Core: XIV Computer Graphics	5	4	25	75	100
	III	17U5CAC15	Core: XV Compiler Design	5	4	25	75	100
	III	17U6CAE__	Elective – II	5	4	25	75	100
	III	17U6CACP08	Practical – VIII Computer Graphics Lab	4	3	40	60	100
	III	17U6CACPR01	PROJECT – I: Project Work (In - House Project)	5	3	40	60	100
	III	17U6CAC16	Core: XVI Java Script	4	3	25	75	100
	IV	17U6CAS04	SBEC: IV: Designing Software - CorelDraw	2	2	25	75	100
	V	17U6EX01	Extension- Activities	-	1	-	-	-
			Total	**30**	**24**	**205**	**495**	**700**

Core Total	180	140	1200	3000	4200

ELECTIVE – I			ELECTIVE – II		
Semester	**Course Code**	**Title**	**Semester**	**Course Code**	**Title**
V	17U5CAE01	E – Commerce	VI	17U6CAE04	Digital Image Processing
	17U5CAE02	Software Quality Assurance		17U6CAE05	Big Data Analytics
	17U5CAE03	Software Testing		17U6CAE06	Grid Computing

SEMESTER I

Subject Title	Allied – I Paper – I- Numerical Methods	Semester	I
Subject Code	17U1MAA03	Specialization	NA
Type	Allied - I	L:T:P:C	4:0:0:4

Objectives:

To learn about the computer based numerical and algebraic equations. Understanding various concepts of numerical analysis.

Unit I	9 Hours

Solution of algebraic and transcendental Equations –Bisection method-Iteration method – Method of false position –Newton Raphson method – Problems.

Unit II	11 Hours

Interpolation with equal intervals –Newton's forward and Backward Interpolation formula – Central Difference Interpolation formula –Gauss's forward and Backward Interpolation formula.

Unit III	10 Hours

Numerical Differentiation – Derivatives using Newton's Forward - Newton's Backward – Striling's Formula.

Unit IV	11 Hours

Numerical Integration – Trapezoidal rule – Simpson's one – Third rule – Simpson's three – Eighth rule – Boole's rule – weddle's rule – Problems.

Unit V	9 Hours

Solution of linear simultaneous equations – Direct method – Matrix inversion method – Gauss elimination method – Gauss - Jordan method – Jacobi's iteration method – Gauss – Seidal iteration - Problems.

Learning Resources

Text Book:
1. Numerical methods by P. Kandasamy, K.Thilagavathy, K.Gunavathi (Third Edition) Publication – S.Chand & company Ltd, New Delhi.

Reference book:
1. Numerical Methods by A. Singaravelu , Publication -Meenakshi company Chennai.
2. Introductory Methods of Numerical Analysis – 4th Edition. S.S. Sastry – Prentice – Hall of India Pvt Ltd , New Delhi.

Web Site Address
1. **https://www.math.ust.hk/~machas/numerical-methods.pdf**
2. **http://www.iitg.ac.in/kartha/CE601/LectureSlides.htm**
3. http://homen.vsb.cz/~lud0016/nm/lecture_notes_01-introduction_and_error_analysis.pdf

Subject Title	Core Course - Programming in C	Semester	I
Subject Code	17U1CAC01	Specialization	NA
Type	Core - I	L:T:P:C	5:0:0:4

Objectives:

This subject deals with syntax and structure of C programming Language and the students will learn the programming skills using C language

UNIT – I	Hours: 12

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.

UNIT – II	Hours: 12

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.

UNIT – III	Hours: 12

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 – All category of .

UNIT – IV	Hours: 12

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.

UNIT – V	Hours: 12

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.

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 Ed.

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**

Subject Title	Core Practical - Programming in C Lab	Semester	I
Subject Code	17U1CACP01	Specialization	NA
Type	Practical - I	L:T:P:C	5:0:0:3

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. Program to find the number of characters, words and lines in a given string.

9. Sorting the given names in ascending and descending order.

10. Program to Swap two numbers using functions.

11. Program to prepare Student Mark list using structure.

12. Program to prepare Pay Bill using files.

Subject Title	Core Course - Fundamentals of Computer Applications	Semester	I
Subject Code	17U1CAC02	Specialization	NA
Type	Core - II	L:T:P:C	5:0:0:4

Objectives:
This subject deals with fundamentals of computer applications which is included the concepts of basic knowledge of computers, number system, logic gates, and logical design of sequential and combinational circuits.

UNIT – I	Hours: 10

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).

UNIT – II	Hours: 10

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

UNIT – III	Hours: 10

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.

UNIT – IV	Hours: 10

Input Devices: Keyboard – Mouse – Digitizing Tablet – Scanners – Magnetic Ink Character Recognition – Optical Character Recognition – Optical Mark Recognition – Bar Code Reader. **Output Devices:** Classification of Monitor-Based on Color –Classification of Monitor-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.

UNIT – V	Hours: 10

Programming Languages: Machine Languages – Assembly Languages – High Level Languages – Types of High Level Languages – Procedural-oriented Languages – Problem-oriented Languages and Application Generators – Natural Languages – Compilers and Interpreters – The Compilation Process. **Operating System:** Functions of an Operating System – Job Management – Batch Management – On-Line 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

Learning Resources

BOOK FOR STUDY:
1. "**Fundamentals of Computer Science and Communication Engineering**", Alexis Leon Mathews Leon, Leon TECH World, UBS Publishers.

Reference Books:
1. "**Fundamentals of Computers**", PHI Learning Private Ltd., V. Rajaraman
2. "**Introduction to Information Systems**" Vijay Nicole Imprints Private Ltd., Alexis Leon, Mathews Leon
3. "**Computer Fundamentals and Applications**" , VIKAS Publications House Private Ltd., Ashok Arora.

Web Site Links:
1. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
2. http://buc.edu.in/sde_book/digi_com.pdf
3. http://www.ddegjust.ac.in/studymaterial/mca-5/mca-203.pdf

SEMESTER II

Subject Title	Allied – I Paper – II-Discrete Mathematics	Semester	II
Subject Code	17U2MAA07	Specialization	NA
Type	Allied - I	L:T:P:C	4:0:0:4

Objectives:

To learn about the discrete structures for computer based applications. Understanding the concepts of discrete mathematic. Learning applications of discrete structures in Computer Applications.

UNIT I :	Hours: 09

Mathematical Logic – Statements and Notations – Connectives – Negation – conjunction – Disjunction – Statement Formulas and Truth Table – Conditional and Biconditional – Well formed Formulas – Tautologies.

UNIT II :	Hours: 11

Normal Forms – Disjunctive Normal Forms – Conjunctive Normal Forms – Principal Disjunctive Normal Forms – Principal Conjunctive Normal Forms– The Theory of Inference for the Statement Calculus – Validity using Truth tables – Rules of Inference – Consistency of premises and indirect method of proof.

UNIT III :	Hours: 10

Relations & ordering – Relations – Properties of binary relation in a set – Functions – Definition & Introduction – Composition of Functions – Inverse function – Binary and n – array operations – Hashing Functions – Natural numbers – Peano Axioms & Mathematical Induction – Cardinality.

UNIT IV :	Hours: 10

Lattices as partially ordered Sets- Definition and Examples – some properties of Lattices – Lattices as Algebraic systems – sub Lattices – Direct product and homomorphism.

UNIT V :	Hours: 10

Boolean Algebra- Definition and Examples – subalgebra, Direct product and homomorphism – Boolean Functions – Boolean Forms and Free Boolean Algebras – Values of Boolean Expression and Boolean Functions.

Learning Resources

TEXT BOOK:
1. "**Discrete Mathematical structures with application to computer science**" by J.P. Trembly, R.Manohar. Publishing Company Tata Mc Graw Hill, NewDelhi 2001.

Reference Books:
1. "**Discrete Mathematics**" by Prof.V. Sundaresan, K.S. Ganapathy Subramaniyan, K. Ganesan Publishing Company Tata Mc Graw Hill, NewDelhi 2001.
2. "**Discrete Mathematics"** by Lovarz,J. Pelikan, K. Vexztergombi Publishing company Springer International Edition 2002.

Web Site Links:
1. **http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf**
2. **http://math.unideb.hu/media/horvath-gabor/publications/CollDiscrMath.pdf**
3. **https://www.cs.cornell.edu/~rafael/discmath.pdf**
4. **http://www.math.northwestern.edu/~mlerma/papers/discrete_mathematics-2005.pdf**

Subject Title	Core Course - Object Oriented Programming with C++ and Object Oriented Systems	Semester	II
Subject Code	17U2CAC03	Specialization	NA
Type	Core - III	L:T:P:C	4:0:0:4

Objectives:

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.

UNIT I Hours:12

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.

UNIT - II Hours:12

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.

UNIT III Hours:12

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. **Managing I/O Operations**: Streams in C++ - C++ Stream Classes – Formatted and Unformatted I/O Operations Managing Output with Manipulators.

UNIT IV Hours:12

Working with Files: Classes for file Stream Operations- Opening and closing a File – Detecting end-of-file- File Pointers and their Manipulators – sequential I/O Operations- Updating a file- Error Handling during File Operations- Command Line Arguments- **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, **Exception Handling**: Basics-Exception Handling Mechanism- throwing Mechanism- Catching Mechanism- Rethrowing an Exception – Specifying Exceptions.

UNIT V Hours:12

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.

Learning Resources
TEXT BOOK:
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)
Books for Reference:
3. Robert Lafore, " Object Oriented Programming in Turbo C++", Galgotia ,2001.
4. Herbert Schildt, "Teach Yourself C++", Third Edition. Tata McGraw Hill, 5th Reprint, 2000
5. K.R Venu Gopal , Rajkumar, T.Ravishankar, "Mastering C++",Tata McGraw Hill Publishing Company Ltd, New Delhi
Web Site Links:
1. https://book-store.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

Subject Title	Practical - Programming in C++	Semester	II
Subject Code	17U2CACP02	Specialization	NA
Type	Practical - II	L:T:P:C	4:0:0:3

List of Programs: **Hours:50**

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 (All Types)

8. Dynamic Polymorphism – Virtual Functions.

9. Formatted I/O and File Operation.

10. Templates

11. Exception Handling

12. Friend Function

Subject Title	Core Course – Office Automation	Semester	III
Subject Code	17U2CAC04	Specialization	NA
Type	Core - IV	L:T:P:C	4:0:0:4

Objectives:
          To provide a hands on experience in the office automation packages.

UNIT- I	Hours: 05

MS-WORD: Introduction: Introduction to Ms-Office.MS-word: Introduction to Word Basics - Commands - Copying and Moving Text - Working with Text - Find and Replace - Formatting Text - Mail Merge –Table - Spell Check and Grammar.

UNIT-II	Hours: 05

MS-EXCEL : Excel Basics - Introduction – Menus – Toolbars -Icons – Opening Excel – Cells – Entering and Editing Data – Creation of Chart- Naming Formulas – Functions .

UNIT-III	Hours: 05

MS-POWER POINT: Introduction – Menus – Toolbars – Creating and Editing Slides – Working with PowerPoint.

UNIT-IV	Hours: 05

MS-ACCESS: Introduction – Starting Microsoft Access – Creating New Database – Opening Existing Database – Access Database Wizards- Tables – Creating Query.

UNIT-V	Hours: 05

MS-FRONT PAGE: Introduction – Menus – Toolbars – Creating Webpage- With Wizard - Hyperlinks.

Learning Resources

TEXT BOOK:
1. Sanjay Saxena, "**MS-OFFICE 2000 for Everyone**", Vikas Pub. House, New Delhi. (Part: I, II, III, IV, V, VI & IX).

Web Site Links:
1. http://www.kopykitab.com/MS-Office-2007-in-A-Nutshell-by-Sanjay-Saxena
2. http://164.100.133.129:81/eCONTENT/Uploads/MS_Office.pdf
3. http://rceroorkee.in/pdf/1005.pdf

SEMESTER III

Subject Title	Allied – II - Paper – I Financial Accounting	Semester	III
Subject Code	17U3CMA03	Specialization	NA
Type	Allied - II	L:T:P:C	4:0:0:4

Objectives:

In a practical sense, the main objective of financial accounting is to accurately prepare the final accounts, otherwise known as the financial statements. Concepts and conventions of Accounting. Basic Accounting framework.

UNIT- I	Hours: 09
What Introduction of Accounting- Objectives- Advantages-Limitations of Accounting- People interested in Accounting- Branches of Accounting- Accounting Concepts and Conventions.	
UNIT-II	**Hours: 11**
Preparation of Journal – Ledger- Subsidiary Books – Trial Balance.	
UNIT-III	**Hours: 10**
Final Accounts of a Trading Concern – Trading Account – Profit & Loss Account – Balance Sheet with simple Adjustments.	
UNIT-IV	**Hours: 09**
Average Due Date – Account Current.	
UNIT-V	**Hours: 11**
Depreciation Accounting – Definition- Objectives- Causes of Depreciation – Reason for providing Depreciation – Depreciation Methods:- Fixed- Written down Value- Annuity Method.	

Learning Resources
TEXT BOOK: 1. R.L.Gupta & V.K. Gupta, "**Financial Accounting**" Sultan Chand & sons, New Delhi, 2008 2. S.P.Jain & K.L.Narang. "Financial Accounting" Kalyani Publishers, New Delhi , 2006
Reference Books: 1. N.Vinayakam, P.L.Mani, K.L.Nagarajan – *Principles of Accountancy* – S.Chand & Company Ltd., 2. T.S.Grewal – *Introduction to Accountancy*- S.Chand & Company Ltd., 3. A.Murthy -Financial Accounting – Margham Publishers 4. P.C.Tulsian - *Advanced Accountancy* – Tata McGraw Hill Companies. 5. A.Mukherjee, M.Hanif – *Modern Accountancy. Vol.1*- Tata McGraw Hill Companies
Web Site Links: 1. **https://www.tutorialspoint.com/accounting_basics/accounting_basics_tutorial.pdf** 2. **http://www.csus.edu/indiv/c/clarket/course1/chap001.pdf** 3. **https://www.ccs.edu/cms/lib/NY01913591/Centricity/Domain/199/ CHAPTER%201%20SUPA%20MY%20NOTES.pdf** 4. **http://novella.mhhe.com/sites/dl/free/0078025362/938392/edmonds8e_book_preface.pdf**

Subject Title	Core Course- Data Structures and Algorithms	Semester	III
Subject Code	17U3CAC05	Specialization	NA
Type	Core - V	L:T:P:C	5:0:0:5

Objectives:

The Students should have understood the various Data structure Algorithms for stack, Queues, Linked List, Trees, Graphs, Sorting and Searching.

UNIT- I	Hours: 10
Introduction and Overview: Definition – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures. **Arrays:** Definition – Terminology – One Dimensional Array – Multidimensional Array – Pointer Arrays.	

UNIT-II	Hours: 12
Linked Lists: Definition – Single Linked List – Circular Linked List – Double Linked List – Circular Double Linked List – Memory Representation. **Stacks:** Definition – Representation of Stack – Operations on Stacks. Applications of Stack: Quick sort – Tower of Hanoi problem.	

UNIT-III	Hours: 14
Queues: Definition – Representation of Queues – Various Queue structures – Applications of Queues: Round Robin Algorithm. **Tables :** Rectangular Tables – Jagged Tables – Inverted Tables – Hash Tables.	

UNIT-IV	Hours: 14
Trees: Basic Terminologies – Definition and Concepts – Representation of Binary trees – Operations on Binary tree – Types: Expression Tree – Binary Search Tree – Heap Trees. **Graphs:** Graph Terminologies - Representation of Graphs – Operations of Graph – Applications of graph: Shortest path problem – Minimum spanning Tree.	

UNIT-V	Hours: 10
Sorting: Basic Terminologies – Sorting Techniques. **Searching:** Basic Terminologies – Linear Search Technique: Binary Search.	

Learning Resources
TEXT BOOK: 1. "**Classic Data Structures**" – Debasis Samanta – PHI Learning private Limited. Second Edition.
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.
Web Site Links: 1. http://www.tutorialspoint.com/data_structures_algorithms/data_structures_algorithms_tutorial.pdf 2. http://lib.mdp.ac.id/ebook/Karya%20Umum/Dsa.pdf 3. http://www.ethoberon.ethz.ch/WirthPubl/AD.pdf

Subject Title	Core Course - Relational Database Management System	Semester	III
Subject Code	17U3CAC06	Specialization	NA
Type	Core - VI	L:T:P:C	5:0:0:4

Objectives:

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

UNIT- I	Hours: 10

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. **Data Base Architecture and Design:** Introduction – Data base architecture – data abstraction – Database Language – Data base Design – Design Constraints.

UNIT-II	Hours: 12

Data Models : Introduction – Conceptual, Physical and logical database model – database relationship – hierarchical model - network model – relational model – ER model – object oriented model – object relational model – Comparison between the various model. **Entity Relationship Model:** Introduction – ER Model – Components of ER model – ER diagram conversions – Relationships – composite entities – entity list – ER diagrams – ER modeling symbols.

UNIT-III	Hours: 14

RDBMS: Introduction – RDBMS terminology – relational data structure – codd's rules Relational. **Data Integrity and database Constraints:** Introduction – integrity constraint – **Data Normalization**: Introduction – pitfalls in relational database design – decomposition. Normalization: Keys – relationships – Types of Normal forms – De-normalization. **Relational Algebra:** Introduction – relational algebraic operations – Aggregate functions – update operations.

UNIT-IV	Hours: 14

SQL: Introduction – history of SQL – characteristics of SQL – Advantages of SQL – SQL data types and literals – types of SQL commands – SQL operators – **Tables, views and Indexes:** Introduction – Views – Indexes. Aggregate functions – INSERT, UPDATE and DELETE operations– join and union.

UNIT-V	Hours: 10

PL/SQL: Programming language: History – Fundamentals – Block structure – commends – Data types – other data types – Declaration – Assignment operation – Bind variables – Substitution variables – printing.
Pl/SQL cursor and exceptions: PL/SQL Composite data types: Records – Tables. PL/SQL Named block: Procedure – Function – Package – Triggers.

Learning Resources

TEXT BOOK:
1. Alexis Leon and Mathew Leon, "**Fundamentals of Database Management System**" TMH Publications Reprint 2010 (Chapter 1, 2, 3, 4, 6, 7, 9, 10, 11, 12, 15, 17, 18, 19, 20, 22, 27).
2. Nilesh shah, "**Database system using ORACLE**" 2nd Ed., PHI publication Reprint 2010 (Chapter 10, 11, 12, 13, 14).

Reference Books:
1. Silberschatz, Korth, "**Database System Concepts**" MCH International Sixth Edition.

Web Site Links:
1. http://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. http://rdbms.ca/database/introduction.html

Subject Title	Core Course - Operating Systems	Semester	III
Subject Code	17U3CAC07	Specialization	NA
Type	Core - VII	L:T:P:C	5:0:0:4

Objectives:

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

UNIT- I	Hours: 12

What Is Operating System – Application Bases – Operating System Environment – Operating System Components and Goals – Operating System Architecture - **Process Concepts**: Introduction – Process Management – Inter Process Communication.

UNIT-II	Hours: 12

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.

UNIT-III	Hours: 12

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.

UNIT-IV	Hours: 12

Memory Management – Single-user Contiguous Memory Allocation – Fixed Partition Multiprogramming – Variable Partition Multiprogramming – Multiprogramming With Memory Swapping. Virtual Memory **Management:** Introduction - Demand Paging - Page Replacement - Page Replacement Strategies.

UNIT-V	Hours: 12

File and Database Systems: File Systems – File Allocation – File Space Management - File Access Control.

Learning Resources

TEXT BOOK:
1. 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 Books:
1. William Stallings "**Operating Systems – Internals & Design Principles**" PHI (P) Ltd, New Delhi – 110001. 5th Edition.
2. **OPERATING SYSTEMS – Achyut Godbole** , 2nd edition, TMH.
3. **OPERATING SYSTEMS Concepts and Design – Milan Milankovic,** 2nd edition, TMH.

Web Site Links:
1. http://www.tutorialspoint.com/operating_system/
2. http://viralpatel.net/taj/operating-system-tutorial.php

Subject Title	Practical – Relational Database Management System Lab.	Semester	III
Subject Code	17U3CACP03	Specialization	NA
Type	Practical - III	L:T:P:C	5:0:0:3

List of Programs: **Hours : 50**

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

6. 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.
7. Writing a PL/SQL Program to find the total amount based on rules similar to the following
      i) If UNIT <= 100 then Price is 85 paise per UNIT.
      ii) If UNIT >101 and <= 150 then Price is 1.50 paise per UNIT.
      iii) If UNIT > 151 then Price is 2.00 paise per UNIT.
8. 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.
9. Write a database trigger to implement the concept of master detail relationship.
10. PL/SQL procedure to design Pay Bill.

Subject Title	SBEC - Internet of Things	Semester	III

Subject Code	17U2CACP04	Specialization	NA
Type	Practical - IV	L:T:P:C	4:0:0:3

Objectives:
- Obtain an overview of IoT applications.
- Comprehend the architecture, design principles and standards of IoT.
- Understand M2M and IoT technology fundamentals.
- Explain IoT reference model and architecture for real-world design constraints.

UNIT- I	Hours: 05

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT- IoT Protocols, IoT communication models, IoT Communication APIs.

UNIT-II	Hours: 05

IoT enabled Technologies- Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, Domain Specific IoTs-Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT-III	Hours: 05

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.

UNIT-IV	Hours: 05

M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

UNIT-V	Hours: 05

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

Learning Resources

TEXT BOOK:
1. Arshdeep Bahga and Vijay Madisetti, "**Internet of Things - A Hands-on Approach**",Universities Press, 2015, ISBN: 9788173719547.
2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "**From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence**", 1st Edition, Academic Press, 2014

Web Site Links:
1. http://www.internet-of-things-research.eu/pdf/IoT-From%20Research%20and%20Innovation%20to%20Market%20Deployment_IERC_Cluster_eBook_978-87-93102-95-8_P.pdf
2. http://www.shahrvan.org/wp-content/uploads/2016/06/Designing-The-Internet-Of-Things.pdf
3. https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf
4. http://static.netduino.com/downloads/books/gsiot/Getting_Started_with_the_Internet_of_Things_LED_Controller.pdf

SEMESTER IV

Subject Title	Allied – II - Paper – II - Cost and Management Accounting	Semester	IV
Subject Code	17U4CMA04	Specialization	NA
Type	Allied – II	L:T:P:C	4:0:0:4

Objectives:

This subject deals with Cost and Accounting. To Impart the Knowledge of Basic cost concepts, element of cost & Preparation of Cost Sheet. To provide basic knowledge of important Methods & Techniques of costing.

UNIT – I	**Hours: 10**
Cost accounting – Meaning, Scope, objectives- Advantages & Limitations- Difference between Cost accounting and Financial Accounting – Elements of Cost – Preparation of Cost Sheet	
UNIT – II	**Hours: 10**
Material Management – Purchase Procedure – Various stock levels- Economic Order Quantity – Bin Card and stores ledger-Pricing of issues – FIFO, LIFO – Simple Average and weighted average Methods – Stock Control.	
UNIT – III	**Hours: 08**
Management Accounting: Nature and Scope- Meaning and definition- Objectives- Management Accounting and Financial Accounting- Management Accounting and Cost Accounting.	
UNIT – IV	**Hours: 10**
Budget and Budgetary Control: Meaning, Importance, Preparation of Sales Budget, Production Budget- Raw materials Budget – Cash Budget – Flexible Budget	
UNIT – IV	**Hours: 10**
Marginal Costing – Break Even Analysis for profit planning and Control – P/V ratio- BEP and Margin of Safety.	

Note: Distribution of Marks – Problems 70% and Theory 30%.

Learning Resources
TEXT BOOK:
1. Jain & Narang, "**Cost Accounting**" Kalyani Publishers, New Delhi , 2006
2. S.N. Maheswari, "**Management Accounting**" Sultan Chand & Sons, New Delhi, 2005.
Reference Books:
3. Reddy & Hari Prasad Reddy, "Cost Accounting" Margham Publishers, Chennai, 2009.
4. Dr. S. Ganesan and Kalavathi, "Management Accounting" Thriumalai Publications, Nagarkoil, 2008
Web Site Links
1. http://www.tutorialspoint.com/accounting_basics/management_accounting_introduction.htm
2. http://jutaacademic.co.za/products/cost-and-management-accounting-1-tutorial-workbook

Subject Title	Core Course - Software Engineering	Semester	IV
Subject Code	17U4CAC08	Specialization	NA
Type	Core - VIII	L:T:P:C	5:0:0:4

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

UNIT- I	Hours: 12

Software and Software Engineering: The nature of software – Software Engineering-software process-software engineering practice-software myths- **Process Models:** Generic process models-prescriptive process models-specialized process models-unified process.

UNIT-II	Hours: 12

Agile Development: Agile process-Extreme programming-Agile process models-**Principles that guide practice:** core principles-Framework activity-**Understanding requirements:** Requirements Engineering-Eliciting requirements.

UNIT-III	Hours: 12

Requirement modeling: Requirement Analysis-Scenario based modeling-Data modeling concepts-Class based modeling –Flow oriented modeling-patterns for requirements modeling-requirements modeling for WebApps.

UNIT-IV	Hours: 12

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.

UNIT-V	Hours: 12

Quality Management: Software quality-Achieving software quality-**software Testing strategies:** system testing-The Arts of Debugging-**Testing conventional Applications:** White box testing-Basis path testing-control structure testing –black box testing-Model based testing-**Risk Management:** Software Risks-Risk identification-Risk Refinement.-**Software process improvement:** The SPI process.

Learning Resources

TEXT BOOK:
1. Roger S.Pressman, "**Software Engineering**" A Practitioner's Approach"-Mc Graw Hill International, 7th Ed 2010 (Chapter 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 14, 17, 18, 28, 30)

Reference Books:
1. Roger S. Pressman, "**Software Engineering – A Practitioner's Approach**" - 6th Edition, Tata McGraw Hill International Edition.
2. Richard Fairley, "**Software engineering concepts**" McGraw Hill Publication. William Stallings "Operating Systems – Internals & Design Principles" PHI (P) Ltd, New Delhi – 110001. 5th Edition.
3. "**Software Engineering for Internet Applications**" – Eve Anderson, Philip Greenspun, Andrew Grumet, 2006, PHI.
4. "**Fundamentals of SOFTWARE ENGINEERING**" – Rajib Mall, 2nd edition, PHI
5. "**SOFTWARE ENGINEERING**" – Stephen Schach, 7th edition, TMH.

Web Site Links:
1. **http://web.firat.edu.tr/mbaykara/softwareengineering.pdf**
2. **https://www.vssut.ac.in/lecture_notes/lecture1428551142.pdf**
3. **https://www.vssut.ac.in/lecture_notes/lecture1423904473.pdf**
4. **https://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf**

Subject Title	Core Course - Visual Programming and VC++	Semester	IV
Subject Code	17U4CAC09	Specialization	NA
Type	Core - IX	L:T:P:C	5:0:0:4

Objectives:
Understood the doing project, creating controls, variables, data types, functions, procedures, arrays.

UNIT- I	Hours: 12

Visual Basic: –What is visual basic- Features of visual Basic – Developing an Application. Forms and controls: Objectives- The From-Working with a Control- Opening the code Window. Variables: Declaring variable - Data Types - The Null Value - Error Value -Empty Value - Scope of a Variable – Module Level Variables - constant-creating your own constant - scope of a constant.

UNIT-II	Hours: 12

The Code Window –The Anatomy of procedure - Editing features. Working with Files– visual basic file system controls. Menus: objectives- Building the User Interface. Multiple Document Interface Applications – Why MDI forms- features of an MDI Form – Loading MDI Forms and Child Forms.

UNIT-III	Hours: 12

Working with the data control: The data control-The bound controls-caution-coding. Data access objects: The JET database engine-functions of the JET database engine-SQL-The DAO objects model-Why ADO-Establishing a reference. Crystal and Data Reports: Crystal reports - Data report. Distributing your application.

UNIT-IV	Hours: 12

Visual C++: C Under Windows: Structure of a Windows Program – Code and Resources – Program Instances. Introduction to MFC: MFC and Windows OS Interaction – Why Use MFC? – What is MFC?

UNIT-V	Hours: 12

Writing Text and Drawing Graphics: MFC Device Context Classes – Keyboard: Keyboard Message Handlers – Mouse: Mouse Message Handlers. Menus: Creating a Menu – Responding Menu Commands.

Learning Resources

TEXT BOOK:
1. Mohammed. Azam, "**Programming with Visual Basic 6.0***" - VIKAS publishing House pvt. Ltd, (2010).
2. Yashavant Kanetkar, "**Visual C++ Programming**", BPB Publications.

Reference Books:
1. Evangelus Petroutsos, "**Mastering Visual Basic 6**", BPB Puhlnata.
2. Gray Cornell, "**VISUAL BASIC 6 from the GROUND UP**", Tata McGraw Hill Edition, 1999.

Web Site Links:
1. **http://cs.baylor.edu/~maurer/aida/desauto/vbasic.pdf**
2. **https://www.tutorialspoint.com/vb.net/vb.net_tutorial.pdf**
3. **http://www.maths.manchester.ac.uk/~pjohnson/VBA-C++/VBA/Handout-notes-on-VBA.pdf**
4. **http://cs-cit.wpunj.edu/dotAsset/308705.pdf**
5. **http://www.cs.armstrong.edu/liang/cpp/supplement/supplement2aVC2012Tutorial.pdf**
6. **http://courses.cs.vt.edu/cs1044/Notes/OLD-A01.MSVCIntro.pdf**
7. **http://www.angelfire.com/art2/ebooks/teachyourselfcplusplusin21days.pdf**

Subject Title	Core Course – Computer Networks and Security	Semester	IV
Subject Code	17U4CAC10	Specialization	NA
Type	Core - X	L:T:P:C	5:0:0:4

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

UNIT- I	Hours: 12

Introduction: Business Applications - Home Applications – LAN – WAN- MAN- Protocol Hierarchies – Protocols and Standards-Connection Oriented and Connection less Services – OSI Reference Model.

UNIT-II	Hours: 12

Physical Layer Transmission Media: Guided Transmission media - Wireless Transmission - Communication Satellites - Public Switched Telephone Network.

UNIT-III	Hours: 12

Data Link Layer: Data Link Layer Design Issues - Error Detection and Correction – Elementary data link protocols - Sliding Window Protocols - Protocols Verification.

UNIT-IV	Hours: 12

Network Layer: Network Layer Design Issues. Routing Algorithms: Shortest Path- Link State – Distance Vector. Congestion Control Algorithms: Principles – Load Shedding. Internetworking: Tunneling – Fragmentation – IP Addresses – Protocols – OSPF.

UNIT-V	Hours: 12

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.

Learning Resources

TEXT BOOK:
1. Andrew S. Tanenbaum, "**Computer Networks**", Fifth edition, PHI private Ltd, New Delhi , 2009.Yashavant Kanetkar, "Visual C++ Programming", BPB Publications.

Reference Books:
1. Behrouz A. Forouzan, " **Data Communication and Networking**", Tata MC- Hill, 2009.
2. "**DATA COMMUNICATION AND NETWORKS**", – Achyut Godbole, 2007, TMH.
3. "**COMPUTER NETWORKS Protocols, Standards, and Interfaces**", – Uyless Black, 2nd ed, PHI.

Web Site Links:
1. http://www.svecw.edu.in/Docs%5CCSECNLNotes2013.pdf
2. https://www.smartzworld.com/notes/computer-network-cn/
3. http://www.infoposter.ac.tz/wp-content/uploads/2016/02/Computer-network-notes.pdf]
4. http://www.darshan.ac.in/Upload/DIET/Documents/CE/2140709_ Computer%20Networks%20Study%20Material%20GTU_23042016_064112AM.pdf

Subject Title	Practical - Visual Programming and VC++ Lab	Semester	IV
Subject Code	17U2CACP05	Specialization	NA
Type	Practical - V	L:T:P:C	5:0:0:3

List of Programs: **Hours: 50**

Visual Basic:

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. Create a form to change the font size using timer control.

4. Create a VB program to add and remove the items in the list box using add item and remove item methods.

5. Construct a simple Calculator.

6. Prepare Students Mark Sheet. (using database)

Visual C++

7. Create a several windows on Screen

8. Draw a Line and a Rectangle in a Window

9. Create a menu item using Keyboard accelerator keys.

10. Write a program which displays a message "Welcome to Vivekanandha" Wherever you click the left mouse button in the client Area

Subject Title	Practical - Image Editing Programming - Photoshop	Semester	IV
Subject Code	17U4CACP06	Specialization	NA
Type	Practical - VI	L:T:P:C	4:0:0:3

Objectives:
This syllabus deals with learning of editing images in Photoshop.

UNIT – I	Hours: 05

System Essentials: CPU – RAM – Hard Disk – Printers – Scanners – Acquiring Images. **File Format Essentials:** Computer Rendered Graphics – Color Depth and Resolution – Understanding Compression – Image Modes

UNIT – II	Hours: 05

Toolbox and Palette Essentials: Viewing and Navigating Images:– The Hand Tool – The Zoom Tool – The Navigator Palette – The Measure Tool – **Selection Tools: –** Marquee Tools – The crop Tool – Lasso Tips – Magic Wand Tips – The Move Tool.

UNIT – III	Hours: 05

Painting and Drawing Tools: Paintbrush Tips – Airbrush Tips – Rubber Stamp Tips – Paint Bucket Tips – Gradient Tips – Pencil Tips – **Editing Tools:-** Blur and Sharpen Tips – Smudge Tips – Dodge, Burn and Sponge Tips.

UNIT – IV	Hours: 05

Color Essentials: Precision: Photoshop's Color Models: RGB – CMYK – HSB – Lab – Web colors – The Color Picker. **Layering Essentials:** Creating New Layers – Deleting Layers – **Manipulating Layers**: Moving Layers – Linking Layers Together – Viewing and Hiding Layers – Editing and Manipulating Layer Styles.

UNIT – V	Hours: 05

Retouching Essentials: Making Tonal Corrections in Grayscale Images: Variations – Levels – Input Levels – Output Levels – Curves. **Making Color Corrections:** Taking Eyedropper and Color Sampler Readings – The color Balance command – The Hue/Saturation Command – Using Histogram Command – Levels – Curves. **Removing Dust Spots and Blemishes:** Using the Clone Stamp and pattern Stamp Tools – Using Feathering to Smooth Transitions.

Learning Resources

TEXT BOOK:
1. Eileen Mullin, "**Inside the Adobe Photoshop 6 Studio**", Prentice-Hall of India, 2000.

Reference Books:
1. Andrew Faulkner, Conrad Chavez, "**Adobe Photoshop Classroom in a Book**", Adobe Press
2. Peter Bauer, "Adobe Photoshop for Dummies", A Wiley Brand.
3. Mike Wooldridge, "**Adobe Photoshop CS 6**"

Web Site Links:
1. **http://www.educate.vt.edu/teeps/photoscanning/phototintro.pdf**
2. **http://www.marquette.edu/ctl/e-learning/documents/PhotoshopPDF.pdf**
3. **http://www.aui.ma/personal/~H.Belhiah/pdf%20files/Photoshop%20CS3%20Tutorial.pdf**
4. **https://helpx.adobe.com/pdf/photoshop_reference.pdf**
5. **http://help.adobe.com/archive/en/photoshop/cs6/photoshop_reference.pdf**

SEMESTER V

Semester	V	Core: XI		Credit	4
Code	17U5CAC11	**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.

UNIT	Syllabus Contents	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.	10
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	10
III	**Inheritance:** Extending a class –Overriding methods. Interfaces: Defining Interface-Extending Interface. Packages: Java API package-creating package-Accessing Package	10
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	10
V	**.AWT Event Handling:** Introduction to AWT package-Introduction to swings. Input/Output Files: Introduction to Files and Streams	10

	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	

Semester	V	Core: XII	Credit	4
Code	17U5CAC12	PHP PROGRAMMING	Hours	5

COURSE OBJECTIVE

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

Unit	Syllabus Contents	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	10
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.	10
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.	10
IV	**Object Oriented PHP:** Benefits of OOP - Key OOPs Concepts-Constructors and Destructors- Static Class Members –The instance of Keyword- **Error and Exception Handling-** Configuration Directives-Error Logging-Exception Handling	10
V	**Strings and Regular Expression:** Other String Specific Function - Alternatives for Regular Expression Functions**. Forms:** PHP and Web Forms-Taking Advantage of Pear: HTML_QuickForm-Installimg HTML_QuickForm-Creating a Simple Form- Using Auto-Completion	10

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

Semester	V	PRACTICAL: VI	Credit	3
Code	17U5CACP06	**JAVA PROGRAMMING LAB**	Hours	4

COURSE OBJECTIVE

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

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.
9. Write a Java Program to draw circle, square, ellipse and rectangle at the mouse click positions.
10. Write a Java Program which open an existing file and append text to that file.

Semester	V	**PRACTICAL – VII**	**Credit**	3
Code	**17U5CACP07**	**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.

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()   c) Isset()   d)Unset()
5. Give the example of String function
   a. Substr();   b) Strcmp()   c) Strcasecmp()   d) Strpos()
6. Write a PHP Program that demonstrates Form element input elements.
7. Database connectivity in PHP with MySQL
8. To Create a table using PHP Programming.
9. To create a table and do all the DDL commands using PHP Programming
10. Develop a PHP program to display student information using MYSQL table.
11. Creating simple webpage using PHP
12. Create a College Web site using PHP Program.

Semester	V	Core: XIII	Credit	3
Code	17U5CAC13	MOBILE APPLICATION DEVELOPMENT	Hours	4

COURSE OBJECTIVE

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

UNIT	SYLLABUS CONTENTS	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.	5
II	Android Application Design Essentials: Anatomy of an Android Applications – Android Terminology - Application Context - Actives – Services – Intents - Receiving and Broadcasting Intents.	5
III	Android Application Design Essentials: User Interface Screen Elements - Designing User Interfaces with Layouts - Drawing and Working with Animation.	5
IV	Using Common Android APIs: Using Android Data and Storage APIs-Managing data using SQLite - Sharing Data between Applications with Content Providers.	5
V	DDMS - Debug and Other View: DDMS - Dalvik Debug Monitor Server - LogCat View.	5

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

Semester	V	SBEC: III	Credit	2
Code	17U5CAS03	**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. To teach students the four basic communication skills, Listening, Speaking, Reading and Writing.

Unit	Syllabus Contents	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.	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.	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.	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.	5
V	**Presentation Skills**: Nature and importance of oral presentation – Planning the presentation – Preparing the presentation – Organizing your presentation – Rehearsing the presentation – Improving delivery.	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.

Semester	V	Elective – I	Credit	4
Code	17U5CAE01	**E - COMMERCE**	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.

Unit	Syllabus Contents	No. of Sessions
I	**Electronic commerce:** Electronic Commerce - Electronic Data Interchange - Value Added Networks - Electronic Commerce over the internet - Internet Commerce Examples –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.	10
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.	10
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.	10
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.- Setting Up a Website - webservers - Business - To-Business EC - Payment for Goods and Services Bottlenecks. Business Process Reengineering: Introduction –Approach to BPR Strategic Alignment Model BPR Methodology. Management of Change: Change Management in Public Administration The Implement Plan	10
V	**Security Issues:** Security Concerns - Security solutions - Electronic Cash over the Internet –Security and UN/EDIFACT Message - Internet Security – Guidelines for Cryptography Policy.	10

Learning Resources	
Text Books	E-Commerce, The Cutting Edge of Business - KamleshK.Bajaj ,Debjani Nag Second Edition Tata Mc-Graw- Hill (Chapter 2,3,4,5,6,7,8,9,10,13,14).
Reference	E-Commerce Strategy, Technologies and Applications David Whiteley Tata Mc-

Books	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

Semester	V	Elective – I SOFTWARE QUALITY ASSURANCE	Credit	4
Code	17U5CAE02		Hours	5

COURSE OBJECTIVE

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

Unit	Syllabus Contents	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.	10
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.	10
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.	10
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.	10
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.	10

Learning Resources	
Text Books	1. Gopalaswamy Ramesh, "Managing Globle Software Projects" Tata McGraw Hill.Publishing Company Ltd, New Delhi, 2002. 2. Pressman, Roger, "Software Engineering ", A Practitioner's approach, 7th edition, Tata Mc- Graw Hill, 2006. 6th Edition
Reference 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

Semester	V	ELECTIVE I	Credit	4
Code	17U5CAE03	SOFTWARE TESTING	Hours	5

COURSE OBJECTIVE

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

Unit	Syllabus Contents	No. of Sessions
I	Building a Software Testing Strategy – Software Testing Design Techniques.	10
II	Software Testing Tools and Selection of Test Automation Products - Software Testing Lifecycle and Software Testing Process. Testing Effort Estimation and Test Planning.	10
III	Software Test Effort Estimation Technique - Pre-Development Testing Requirements and Design Phase – Best Practices in Program Phase Unit, System and Integration Testing.	10
IV	A Case Study on Acceptance Testing – Implementation an Effective Test Management Process – Building an Effective Test Organization..	10
V	Testing in Today's Business and Usability – Testing of Web – Based Applications	10

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	2. "Software Testing Principles and Practices" by Srinivasan Desikan & Gopalaswamy Ramesh, Pearson Education, Sixth Impression, 2008.

« SEMESTER – VI »

Semester	VI	CORE: XIV	Credit	4
Code	17U6CAC14	**COMPUTER GRAPHICS**	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.

Unit	Syllabus Contents	No. of Sessions
I	Introduction to Computer Graphics-GUI-Video Display Devices-CRT-Raster and Random scan displays-Input Devices-Hard Copy Devices-Line Drawing Algorithm-DDA Algorithm-Line Function – Circle Generating Algorithm.	10
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.	10
III	2D Transformations- 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.	10
IV	Basic Modeling Concepts-Input of Graphical Data-Input Functions-Picture Construction Techniques.	10
V	3D Display Methods-3D Concepts-Depth Buffer Method- A Buffer Method - Scan Line Method- Color Models- Xyz, RGB-YIQ CMY Color Models.	10

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.

Semester	VI	Core: XV Compiler Design	Credit	4
Code	17U6CAC15		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.

Unit	Syllabus Contents	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.	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.	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 – Representing scope	12
IV	**Run time storage administration**: Implementation of a simple stack allocation scheme –Implementation of block-structured languages. Error deduction and recovery: Errors – Lexical phase errors – Syntactic phase errors – Semantic errors.	12
V	**Introduction of code optimization**: The principle sources of optimization – Loop optimization – The DAG representation of basic blocks –Global data flow analysis. Code generation: Object programs – Problems in code generation–A simple code generator – Register allocation and assignment –Code generation from DAG's–Peepholes optimization	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

Semester	V	**PRACTICAL – VIII**	**Credit**	3
Code	**17U6CACP08**	**COMPUTER GRAPHICS LAB**	**Hours**	4

COURSE OBJECTIVE

List of Programs:
1. DDA Line Drawing Algorithm.
2. Circle Generating Algorithm.
3. 2D Transformations.
4. 2D Other Transformations.
5. 3D Transformation.
6. 3D Other Transformations.
7. 3D Viewing Concepts.
8. Clipping Operations (Line, Curve, Text).

Semester	V	**PROJECT WORK**	Credit	3
Code	**17U6CACPR01**	**(IN HOUSE PROJECT)**	Hours	5

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)

Semester	VI	**Core: XVI** **JAVA SCRIPT**	Credit	3
Code	**17U6CAC16**		Hours	4

COURSE OBJECTIVE

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

animation and compression techniques

Unit	Syllabus Contents	No 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.	**5**
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.	**5**
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.	**5**
IV	JS Forms-Forms Validation Forms API-JS Objects-Object Definitions-Object Properties Object Methods Object Prototypes.	**5**
V	JS Functions-Function Definitions Function Parameters Function Invocation Function Closures.	**5**

Learning Resources	
Text Books	Michael Moncur, "Teach Yourself Java Script in 24 Hours**".** Fourth Edition, published by Pearson Education.
Reference Books	Addy Osmani, "Java Script Design Patterns for Beginner"
Website links	http://www.tutorialspoint.com/javascript/javascript_tutorial.pdf http://cglab.ca/~morin/teaching/2405/notes/javascript1.pdf

Semester	VI	SBEC: IV Designing Software - CorelDRAW	Credit	2
Code	17U6CAS04		Hours	2

COURSE OBJECTIVE

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

Unit	Syllabus Contents	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- menu bar-standard-toolbar-property bar-tool box-drawing page-docker-color palette-drawing basic geometric figures- working with page layout	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.	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.	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.	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-color transform-sharpen- tracing.	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

Semester	VI	Elective – II	Credit	4
Code	17U6CAE04	**DIGITAL IMAGE PROCESSING**	**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.

Unit	Syllabus Contents	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.	10
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.	10
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- Pseudo color Image Processing- Basics of Full-Color Image Processing- Color Transformations- Smoothing and Sharpening- Image Segmentation Based on Color - Noise in Color Images- Color Image Compression	10
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.	10
V	**Image Data Compression:** Image Data Properties – Discrete Image Transforms in Image Data Compression – Predictive Compression Methods – Vector Quantization – Hierarchal and Progressive Compression Methods – Comparison of Compression Methods – Coding – JPEG and MPEG Image Compression - Texture.	10

	Learning Resources
Text Books	Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Prentice Hall, 3rd Ed, 2008 Sonka, Hlavac, Boyle, "Digital Image Processing and Computer Vision", Cengage Learning, Fourth Indian Reprint 2011
Reference Books	Anil.K.Jain, "Fundamentals of Digital Image Processing", Prentice Hall, 1989. Chanda & Majumdar, "Digital Image Processing and Analysis", Prentice Hall 3rd Ed. Practice. ", 1993 34th Reprint. Tata McGraw-Hill. NewDelhi.
Website	http://www.nprcet.org/ece/document/DIP.pdf

Semester	VI	ELECTIVE: II	Credit	4
Code	17U6CAE05	**BIG DATA AND ANALYTICS**	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

Unit	Syllabus Contents	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 Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools.	10
II	**HADOOP FRAMEWORK:** Distributed File Systems - Large-Scale File System Organization –HDFS concepts – Map Reduce Execution, Algorithms using Map Reduce, Matrix-Vector Multiplication –Hadoop YARN	10
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, Clustering High Dimensional Data - Predictive Analytics –Data analysis using R.	10
IV	**MINING DATA STREAMS**: Streams: Concepts –Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-series data - Real Time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.	10
V	**BIG DATA FRAMEWORKS**: Introduction to NoSQL –Aggregate 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 – HiveQL Queries	10

	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.

Semester	VI	Elective – II	Credit	4
Code	17U6CAE06	**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 understand the Grid computing processor architecture that combines computer resources from various domains

Unit	Syllabus Contents	No. of Sessions
I	**GRID COMPUTING** : Introduction – Early and Current Grid activities – Grid Business areas – Grid Applications – Grid Infrastructure	10
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. The Grid computing Anatomy: Grid Architecture – Relationship to other distributed Technologies. The Grid computing Road map.	10
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.	10
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.	10
V	**GRID COMPUTING TOOL KITS**: Globus GT3 Toolkit – Architecture – Programming model, – A Sample implementation – High level services: Introduction – Information service Index services – Resource information provider Services – Resource management service – Data Management service.	10

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