Bachelor of Computer Applications

[Specialization in Visual Effects (VFX)]

**Scheme of Study**

**BCA- Semester I**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Teaching hrs/week** | **L-T-P** | **Credits** | **UE** | **CIA** | **Total** |
| 14BCA101 | Language | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA102 | English | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA103 | Fundamentals of Mathematics | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA104 | Computer Fundamentals & Organization | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA105 | Programming in C | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA106 | Introduction to Linux | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| **Learning Labs** | | | | | | | |
| 14BCA107L | C Programming Lab | 03 | 0-0-1 | 01 | CA -50 | | 50 |
| 14BCA108L | Linux Lab | 03 | 0-0-1 | 01 | CA -50 | | 50 |
|  | **Total** | 30 |  | 26 |  | | **700** |

Cumulative Credits-26

**BCA - Semester II**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Teaching hrs/week** | **L-T-P** | **Credits** | **UE** | | **CIA** | **Total** |
| 14BCA201 | Language | 04 | 4-0-0 | 04 | 80 | | 20 | 100 |
| 14BCA202 | English | 04 | 4-0-0 | 04 | 80 | | 20 | 100 |
| 14BCA203 | Operating Systems | 04 | 4-0-0 | 04 | 80 | | 20 | 100 |
| 14BCA204 | Oops With C++ | 04 | 4-0-0 | 04 | 80 | | 20 | 100 |
| 14BCA205 | Data Structures Using C | 04 | 4-0-0 | 04 | 80 | | 20 | 100 |
| **Learning Labs** | | | | | | | | |
| 14BCA207L | Oops With C++ Lab | 03 | 0-0-1 | 01 | CA -50 | | | 50 |
| 14BCA208L | Data Structures Lab | 03 | 0-0-1 | 01 | CA -50 | | | 50 |
|  | **Total** | 30 |  | 26 |  | | | **700** |
| **Value Enhancing Courses** | | | | | | | | |
| 14BCA206 | Mind Management & Human Values | 04 | 4-0-0 | 04 | 80 | 20 | | 100 |

Cumulative Credits-26+26=52

**BCA-Semester III**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Teaching hrs/week** | **L-T-P** | **Credits** | **UE** | **CIA** | **Total** |
| 14BCA301 | Information Security Fundamentals | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA302 | Software Engineering | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA303 | RDBMS | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA304 | Computer Networks | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| 14BCA305 | Programming in JAVA | 04 | 4-0-0 | 04 | 80 | 20 | 100 |
| **Learning Labs** | | | | | | | |
| 14BCA307L | RDBMS Lab | 03 | 0-0-1 | 01 | CA -50 | | 50 |
| 14BCA308L | JAVA Programming Lab | 03 | 0-0-1 | 01 | CA -50 | | 50 |
|  | **Total** | 30 |  | 26 |  | | **700** |
| **Value Enhancing Courses** | | | | | | | |
| 14BCA306 | Indian Constitution | 04 | 4-0-0 | 04 | 80 | 20 | 100 |

Cumulative Credits-26+26+26=78

**BCA (VFX) - Semester IV**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Hrs/Week** | **Credits** | | **Total Marks** | | | | |
| **L – P – T** | **IA** | | **UE** | | **Total** |
| 14BCAVFX401 | Visual Design | 2 – 3 – 1 | 4 | | 10(Th)+50(CA) | | 40(Th) | | 100 |
| 14BCAVFX402 | Digital Art | 2 – 3 – 1 | 4 | | 10(Th)+50(CA) | | 40(Th) | | 100 |
| 14BCAVFX403 | 3D Lab – I | 2 – 3 – 1 | 4 | | 10(Th)+50(CA) | | 40(Th) | | 100 |
| 14BCAVFX404 | Compositing Techniques – I | 2 – 3 – 1 | 4 | | 10(Th)+50(CA) | | 40(Th) | | 100 |
| 14BCAVFX405 | VFX Preproduction | 4 – 0 – 0 | 4 | | 20 | | 80 | | 100 |
| 14BCAVFX406 | Cinematography | 3 – 3 – 0 | 4 | | 10(Th)+50(CA) | | 40(Th) | | 100 |
| **Total** | | **38** | **28** | | **320** | | **280** | | **700** |
| **Value Enhancing Course (VEC)** | | | | | | | | | |
| 14BCAVFX407 | Environmental studies | 4 - 0 – 0 | | 4 | | 20 | | 80 | 100 |

Cumulative Credits-26+26+26+28=106

**BCA (VFX) - Semester V**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Hrs/Week** | **Credits** | **Total Marks** | | |
| **L – P – T** | **IA** | **UE** | **Total** |
| 14BCAVFX501 | 3D Lab – II | 3 – 3 – 1 | 5 | 10(Th)+50(CA) | 40(Th) | 100 |
| 14BCAVFX502 | Matte Painting | 2 – 3 – 1 | 4 | 10(Th)+50(CA) | 40(Th) | 100 |
| 14BCAVFX503 | 3D Dynamics I | 3 – 3 – 1 | 5 | 10(Th)+50(CA) | 40(Th) | 100 |
| 14BCAVFX504 | Photo Realistic Lighting & Rendering | 4 – 3 – 1 | 6 | 10(Th)+50(CA) | 40(Th) | 100 |
| 14BCAVFX505 | Studio Design & Project Management | 4 – 0 – 0 | 4 | 20 | 80 | 100 |
| 14BCAVFX506 | Compositing Techniques – II | 2 – 3 – 1 | 4 | 10(Th)+50(CA) | 40(Th) | 100 |
| **TOTAL** | | **38** | **28** | **320** | **280** | **600** |

Cumulative Credits-26+26+26+28+28=134

**BCA (VFX) - Semester VI**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Hrs/Week** | **Credits** | **Total Marks** | | |
| **L – P – T** | **IA** | **UE** | **Total** |
| 14BCAVFX601 | Motion Graphics | 3 – 3 – 1 | 5 | 10(Th)+50(CA) | 40(Th) | 100 |
| 14BCAVFX602 | 3D Dynamics - II | 3 – 3 – 1 | 5 | 10(Th)+50(CA) | 40(Th) | 100 |
| **TOTAL** | | **14** | **10** | **120** | **80** | **200** |

**Project Work**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Subject Code** | **Name of subject** | **Credits** | **Total Marks** | | |
| **IA** | **UE**  **Dissertation + Viva)** | **Total** |
| 14BCAVFX603 | Final Project and Viva-voce | 16 | 100 | 150 +50 | 300 |
| **Total** | | **16** | **100** | **200** | **300** |

**Cumulative credits = 26 + 26 + 26 + 28 + 28 + 26 = 160**

**SYLLABUS**

Semester I

LANGUAGE

1SAN1A - SANSKRIT

**Structure of Syllabus**

1 Epic Literature **30 Hours**

2 Katha Saahitya **20 Hours**

3 Grammar **10 Hours**

**Detailed Syllabus**Valmiki Ramayanam-Ayodhya Kanda 1st Sarga.

Hitopadesha of Narayana Pandita- Suhrudbheda

Amarakosha (Sasya varga)

**Books for Reference:**

* Srimad Valmiki Ramayana :Kannada Translation ;Vidwan N Ranganatha Sharma
* Srimad Valimiki Ramayanam –Gorakhpur Edition
* Hitopadesha –MR Kale Pub: MLBD.

**1KAN1A - KANNADA**

1. **Halegannada Kavya** Krishna Draupadhi Samvadha (Udhyoga Parva)

6 ne sandi, padya 20-30

1. **Vachanagalu** **BASAVANNANA VACHANAGALU**
2. LokadaDonkaNeevakeTiduvere
3. VyadhanonduMolavaKondu
4. ThanashrayadaPratisukhavanu

**MUKTYAKKANA VACHANAGALU**

1. KrodhavembaHolageriyaThoravantu
2. TannaTaanariyadavgeAreve Guru
3. SathyaullalliShabaduHingadu **20 Hours**

**3.** **Keerthenegalu** **VIJAYA DASARU**

* 1. Athmanivadene
  2. AavapariyaliNenanuOlisali
  3. ErabaaradeBadavaJagathinolu

**SRIPADARAYARU**

1. KangaligyathakooKaveriRanganaNodhada

2. YaakePuttesede Nee Saakalaarade

3. BhushanakeBhushanaEduBhushana **20 Hours**

**4. HosagannadaKavya** CholaKanneyaru – B.M.Shree

Gandhi – G S Shivarudrappa

PentayanaAngi – K V Tirumalesh

Helu Baa Geleya – Mamata G Sagar **20 Hours**

1HIN1A - HINDI

**I. GADYA SUMAN** (60 MARKS) **50 Hours**

1. MAANSIK PARADHEENTA – PREMCHAND – NIBANDH

2. DINKAR KI DIARY – RAMDHARI SINH ‘DINKAR’ – DIARY

3. KITABON KI DUKAN AUR DAVAON KI – HARISHANKAR PARSAI – VYANGYA

4. CHAMATKAR – UPENDRANATH ASHK – EKANKI

5. SABIYAA – MAHADEVI VERMA – REKHACHITRA

6. TIBET KI ORE – RAHUL SANKRUTYAYAN – YATRA VRUTTANT

7. JOOTHAN – OM PRAKASH ‘VALMIKI’ - ATMAKATHA

8. TEEN KILO KI CHORI – MRUDULA GARG – KAHANI

**II.** a) **VYAKARAN** – VIRAM CHIHN EVAM VAKYA SHUDDHI

b) **ANUVAAD** – TAKNIKI SHABDAVALI (20 MARKS) **10 Hours**

1ADE1 - ADDITIONAL ENGLISH

**Poetry 20 Hours**

1. The Meadow Mouse Theodore Roosevelt
2. Road to Mandalay Rudyard Kipling
3. Death The Leveler J. Shirley
4. Hunting Snake Judith Wright
5. Invocation Keki N. Daruwalla
6. Old Father William Robert Southey
7. Ever Notice How It Is With Women? Margaret Randall

**Essays 20 Hours**

1. Education-Indian and American Anurag Mathur
2. Shooting an Elephant George Orwell
3. Social Responsibilities Bertrand Russell
4. And then Gandhi Came Jawaharlal Nehru

Extract from Shakespeare’s Hamlet-Polonius’ Advice to Laertes

**Short Stories 20 Hours**

1. The Day of the Golden Deer ShashiDeshpande

2. The Magic Shop M. Mukundan

3. Cop and the Anthem O’ Henry

4. Captain Sharkey Sir Arthur Conan Doyle

**1ENG2 - ENGLISH**

**Essay/Short Story 20 Hours**

1. Toasted English R.K.Narayan
2. Gift of the Magi O’Henry
3. On Education Einstein
4. How to name a Dog James Thurber
5. The Subtle Art of Story Telling Utpal Kumar Banerjee

**Poetry 20 Hours**

1. The World is too much with us William Wordsworth
2. La Belle DAME Sans Merci John Keats
3. Richard Cory E.A.Robinson
4. Brahma Emerson
5. A River A.K.Ramanujan
6. Nikki Rosa Nikki Giovanni

**Grammar 20 Hours**

1. Vocabulary
2. Subject-Verb Agreement
3. Transformation of sentences(simple, complex and compound)

14 BCA103 - FUNDAMENTALS OF MATHEMATICS

**Module 1: Matrix Theory 15 Hours**

1.1 Introduction

1.2 Elementary row and column transformation

1.3 Inverse of a non-singular matrix by elementary transformation

1.4 Rank of a matrix

1.5 Invariance of rank under elementary transformations

1.6 Determination of rank of a matrix by reducing it to echelon form

1.7 Linear equations

1.8 Homogeneous linear equations

1.9 Non – homogenous equations

**Module 2: Mathematical Logic 15 Hours**

2.1 Open sentences

2.2 Compound open sentences

2.3 quantifiers

2.4 Truth sets

2.5 Connectives involving quantifiers

2.6 Logical implications

2.7 Rules of inference

2.8 Methods of proof

2.9 Methods of disproof

**Module 3: Set Theory 15 Hours**

3.1 Fundamentals of set operations

3.2 Subsets

3.3 Counting and Venn Diagrams

3.4 Relations

3.5 Functions: Plain and one to one

3.6 Onto Functions: Stirling Numbers of the second kind

3.7 Special Functions

3.8 The Pigeonhole Principle

3.9 Function Composition and Inverse Functions

**Module 4: Permutations and Combinations 15 Hours**

4.1 Introduction

4.2 The rule of sum and product

4.3 Permutations

4.4 Permutations with Repetitions and Permutations of Objects not all Different

4.5 Circular Permutations

4.6 Combinations

4.7 Combinations with Repetition

**Books for Reference:**

* Matrices and Algebra – Mittal and Arora
* Vector algebra – Vasistha A.R.- Wiley Eastern Limited , New York
* Elements of Discrete Mathematics – Liu
* Foundation of Discrete Mathematics – Joshi
* Discrete and Combinatorial mathematics – Grimaldi and Ramanna – Pearson Education.

14BCA104 - COMPUTER FUNDAMENTALS & Organization

**Module 1 10 Hours**

General features of a computer, Generation of computers, Personal computer, workstation, mainframe computer and super computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia.

**Module 2 14 Hours**

Computer organization, central processing unit, computer memory – primary memory and secondary memory. Secondary storage devices – Magnetic and optical media. Input and output units. OMR, OCR, MICR, scanner, mouse, modem.

**Module 3 16 Hours**

Computer hardware and software. Machine language and high level language. Application software, computer program, operating system. Computer virus, antivirus and computer security. Elements of MS DOS and Windows OS. Computer arithmetic, Binary, octal and hexadecimal number systems. Algorithm and flowcharts, illustrations, elements of a database and its applications. Module-3

Basic Gates(Demorgans theorems, duality theorem, NOR,NAND,XOR,XNOR gates), Boolean expressions and logic diagrams, Types of Boolean expressions.

**Module 4 08 Hours**

Word processing and electronic spread sheet. An overview of MSWORD, MSEXCEL and MSPOWERPOINT.

**Module 5 12 Hours**

Network of computers. Types of networks, LAN, Intranet and Internet. Internet applications. World wide web, E-mail, browsing and searching, search engines, multimedia applications.

**Books for Reference:**

* Alexis Leon and Mathews Leon (1999) : Fundamentals of information Technology, Leon Techworld Pub.
* Jain, S K (1999) : Information Technology “O” level made simple, BPB Pub
* Jain V K (2000) “O” Level Personal Computer software, BPB Pub.
* Rajaraman, V (1999): Fundamentals of Computers, Prentice Hall India
* Hamacher, Computer Organization McGrawhill
* Alexis Leon: Computers for everyone. Vikas, UBS
* Anil Madaan : Illustrated Computer Encyclopedia. Dreamland Pub
* Sinha. Computer Fundamentals BPB Pub.

14BCA105 - PROGRAMMING IN C

**Learning outcomes:**

To understand logic development in programming and to learn Programming in C Language.

**Module 1: Overview of Programming 7 Hours**

**Introduction to computer based problem solving**, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement, **Programming environment** – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters

**Module 2: Fundamentals of C programming 24 Hours**

**Overview of C**, Data Types, Constants & Variables, Operators & Expressions, **Control constructs**-if then, for, while, **Arrays**- single & multidimensional arrays, **Functions**-fundamentals – general form, function arguments, return value, **Basic I/O**-formatted and Unformatted I/O, **Advanced features**- Type modifiers and storage class specifiers for data types, Bit operators, ? operator, &operator, \* operator, Type casting, type conversion.

**Module 3: Advanced programming techniques 09 Hours**

**Control constructs**- Do while, Switch statement, break and continue, exit() function, go to and label, **Scope rules**- Local & global variables, scope rules of functions, **Functions**-parameter passing, call by value and call by reference, calling functions with arrays, argc and argv, recursion- basic concepts, ex-towers of Hanoi

**Module 4: Dynamic data structures in C 12 Hours**

**Pointers**- The & and \* operator, pointer expression, assignments, arithmetic, comparison, malloc vs calloc, arrays of pointers, pointers to pointers, initializing pointers, pointers to functions, function retuning pointers, **Structures**- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers, arrays and structures within structures, **Unions** – Declaration, uses, enumerated data-types, typedef

**Module 5: Additional features 08 Hours**

**File Handling** – The file pointer, file accessing functions, fopen, fclose, puc, getc, fprintf, **C Preprocessor-** #define, #include, #undef, Conditional compilation directives, **C standard library and header files**: Header files, string functions, mathematical functions, Date and Time functions

**Books for Reference:**

* 2. Let us C by Yashwant Kanetka, 6th Edition, PBP Publication
* The C programming Language by Richie and Kenninghan, 2004, BPB Publication
* Programming in ANSI C by Balaguruswamy, 3rd Edition, 2005, Tata McGraw Hill

**14BCA106 - INTRODUCTION TO LINUX**

**Module 1: Linux Introduction 14 Hours**

Introduction to Multi user System, History of UNIX, Features & Benefits, Versions of UNIX, Features of UNIX File System,, Commonly Used Commands like who, pwd, cd, mkdir, rm, rmdir, ls, mv, ln, chmod, cp, grep, sed, awk ,tr, yacc etc. getting Started (Login/Logout) . Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces.

**Exploring Linux Flavors** Introduction to various Linux flavors. , Debian and rpm packages, Vendors providing DEBIAN & RPM distribution & Features. Ubuntu. History, Versions, Installation, Features, Ubuntu one. Fedora: History, Versions, Installation, Features.

**Module 2: The Unix File System** **12 Hours**

Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode -

Super block - Inode assignment to a new file - Allocation of disk blocks.

System calls for the file System: Open – Read - Write - Lseek – Close - File creation -

Creation of special files - Changing directory and root - changing owner and mode - stat

and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.

**Module 3: Unix Process Management 10 Hours**

The Structure of Processes: Process States and Transitions - Layout of system memory -

Context of a process.

Process Control: Process Creation – Signals – Process Termination – Invoking other

programs – PID & PPID – Shell on a Shell.

**Module 4: Vi Editor 12 Hours**

Vi Editor: Introduction to Text Processing, Command & edit Mode, Invoking vi, deleting & inserting Line, Deleting & Replacing Character, Searching for Strings, Yanking, Running Shell Command Macros, Set Window, Set Auto Indent, Set No. Communicating with Other Users: who, mail, wall, send, mesg, ftp.

**Module 5: System administration 12 Hours**

Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of user’s accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command

**Text Books:**

* The Design of Unix Operating System, Maurice J. Bach, Pearson Education, 2010
* .Advance UNIX, a Programmer’s Guide, S. Prata, BPB Publications, and New Delhi, 2011
* Unix Concepts and Applications, Sumitabh Das, 2010
* The UNIX Programming Environment, B.W. Kernighan & R. Pike, Prentice Hall of India. 2009
* Guide to UNIX Using LINUX, Jack Dent Tony Gaddis, Vikas/ Thomson Pub. House Pvt. Ltd. 2010

14BCA107L - C PROGRAMMING LAB

**List of Programs**

**Part A**

1. Printing the reverse of an integer.
2. Printing the odd and even series of N numbers.
3. Get a string and convert the lowercase to uppercase and vice--versa using getchar() and putchar().
4. Input a string and find the number of each of the vowels appear in the string.
5. Accept N words and make it as a sentence by inserting blank spaces and a full stop at the end.
6. Printing the reverse of a string.

**Part B**

1. Searching an element in an array using pointers.
2. Checking whether the given matrix is an identity matrix or not.
3. Finding the first N terms of Fibonacci series.
4. Declare 3 pointer variables to store a character, a character string and an integer respectively. Input values into these variables. Display the address and the contents of each variable.
5. Define a structure with three members and display the same.
6. Declare a union with three members of type integer, char, string and illustrate the use of union.
7. Recursive program to find the factorial of an integer.
8. Finding the maximum of 4 numbers by defining a macro for the maximum of two numbers.
9. Arranging N numbers in ascending and in descending order using bubble sort.
10. Addition and subtraction of two matrices.
11. Multiplication of two matrices.
12. Converting a hexadecimal number into its binary equivalent.
13. Check whether the given string is a palindrome or not.
14. Demonstration of bitwise operations.
15. Applying binary search to a set of N numbers by using a function.
16. Create a sequential file with three fields: empno, empname, empbasic. Print all the details in a neat format by adding 500 to their basic salary.

**14BCA108L - INTRODUCTION TO LINUX/UNIX LAB**

**List of Programs**

1. Execute 25 basic commands of UNIX.

2. Basics of functionality and modes of VI Editor.

3. WAP that accepts user name and reports if user is logged in.

4. WAP which displays the following menu and executes the option selected by user:

1. ls 2. Pwd 3. ls –l 4. ps –fe

5. WAP to print 10 9 8 7 6 5 4 3 2 1 .

6. WAP that replaces all “\*.txt” file names with “\*.txt.old” in the current.

7. WAP that echoes itself to stdout, but backwards.

8. WAP that takes a filename as input and checks if it is executable, if not make it executable.

9. WAP to take string as command line argument and reverse it.

10. 1. Create a data file called employee in the format given below:

a. EmpCode Character

b. EmpName Character

c. Grade Character

d. Years of experience Numeric

e. Basic Pay Numeric

$vi employee

A001 ARJUN E1 01 12000.00

A006 Anand E1 01 12450.00

A010 Rajesh E2 03 14500.00

A002 Mohan E2 02 13000.00

A005 John E2 01 14500.00

A009 Denial SmithE2 04 17500.00

A004 Williams E1 01 12000.00

Perform the following functions on the file:

a. Sort the file on EmpCode.

b. Sort the file on

(i) Decreasing order of basic pay

(ii) Increasing order of years of experience.

c. Display the number of employees whose details are included in the file.

d. Display all records with ‘smith’ a part of employee name.

e. Display all records with EmpName starting with ‘B’.

f. Display the records on Employees whose grade is E2 and have work experience of 2 to 5 years.

g. Store in ‘file 1’ the names of all employees whose basic pay is between 10000 and 15000.

h. Display records of all employees who are not in grade E2.

Semester II

LANGUAGE

**2SAN1A - SANSKRIT**

**Structure of Syllabus**

1. Poetry **25 Hours**

2. Katha sahitya **25 Hours**

3. Grammar **10 Hours**

**Detailed Syllabus**

Mahakavyam-Kiraatarjuneeyam- II sarga

Vetalapanchavimshati Selected 4 stories.

Sanjna and kaarakaprakarana.of Laghu Siddhanta kaumudi

**Books for Reference:**

* Kiratarjuneeyam-1 to 3 cantos Pub: MLBD.
* Laghu Siddhanta Kaumudi of Varadraja -James Ballantyne Pub:MLBD
* Vetalapanchavimshati MLBD.

**2KAN1A - KANNADA**

**I. NATAKAGALU 20 Hours**

1. HittinaHunja GirishKarnad
2. VigadaVikramaraya Samsa

**II. LALITHA PRABANDHAGALU 20 Hours**

1. Hagaluganasu A N MurthyRao
2. AravathuDaathidamele Chi.Sreenivasaraju
3. Hogalekegalu, Tegalekegalu, Helike H Dhundhiraj
4. JaagatikarnadhaDhukimukhagalu NageshHegde

**III. BHASHABHYASA 20 Hours**

1. KalpanikaChitrana
2. GadhyabhagavannuNatakaRoopavaagiParivarthisuvudu
3. SankshepaLekhana

**2HIN1A - HINDI**

**I. KAVYA SANGRAH** (60 MARKS) **50 Hours**

1. TULSIDAS – KEVAT PRASANG (RAMCHARITMANAS)

2. MEERABAI – PADAVALI

3. GEET – SUMITRANANDAN PANT

4. SUBHASH KI MRITYU – Dr. DHARAMVEER BHARATHI

5. MUJHE KADAM KADAM PAR – GAJANAN MADHAV MUKTIBODH

6. MANAV RAAG – VIJAYDEV NARAYAN SAHI

7. SHAMEIN BECH DI HAIN – KEDARNATH AGARWAL

8. AKAAL DARSHAN - DHUMIL

**II.** a) **VYAKARAN** – ALANKAR (20 MARKS) **10 Hours**

b) **APATHITH GADYANSH**

**2ADE1 - Additional English**

**Poetry 15 Hours**

1. Silk intent Robert Frost

2. O Captain my Captain Walt Whitman

3. Insensibility Wilfred Owen

4. Anti-Socialist Person Marsha Prescod

5. Of Hidden Taxes Marge Piercy

Extract from Shakespeare-The Taming of the Shrew, Act V, Scene II

**Essays 10 Hours**

1. Getting up on Cold Mornings Leigh Hunt
2. Does Culture Matter? E. M. Forster
3. The Beggar R. L. Stevenson
4. The Spectator Club Joseph Addison

**Novel 35 Hours**

1. JonathanLivingstoneSea Gull Richard Bach

**2ENG2 - ENGLISH**

**Essay/Short story 25 Hours**

1. Sermons in cats Aldous Huxley

2. Sporting Spirit George Orwell

3. Pepe Maxim Gorky

4. The Key A.E.W.Mason

5. The Child Premchand

6. Wife of a Hero A.J. Cronin

**Poetry 20 Hours**

1. God’s Granduer G.M. Hopkins

2. Ode to a skylark P.B.Shelley

3. Aging Maya Angelou

4. Elephant D.H.Lawrence

5. The Journey of the Magi T.S.Eliot

6. The Second Coming W.B.Yeats

7. The Unknown Citizen W.H. Auden

**Grammar 15 Hours**

1. Active and passive voice

2. Direct and Indirect speech

3. Framing Questions

4. Correction of Errors

**14BCA203 - OPERATING SYSTEMS**

**Module 1: Introduction to Operating System 7 Hours**

Introduction, Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines.

**Module 2: Process Management 22 Hours**

**Processes**: Process concept, Process scheduling, Co-operating processes, Operations on processes, Inter process communication, Communication in client-server systems.

**Threads:** Introduction to Threads, Single and Multi-threaded processes and its benefits, User and Kernel threads, Multithreading models, Threading issues.

**CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-time Scheduling, Algorithm Evaluation, Process Scheduling Models.

**Process Synchronization:** Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions

**Deadlocks:** System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**Module 3: Storage Management 22 Hours**

**Memory Management**: Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging.

**Virtual Management**: Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, Operating System Examples, Page size and other considerations, Demand segmentation

**File-System Interface**: File concept, Access Methods, Directory structure, File- system Mounting, File sharing, Protection and consistency semantics

**File-System Implementation**: File-System structure, File-System Implementations, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery

**Disk Managemen**t: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation

**Module 4: Protection and Security 9 Hours**

**Protection**: Goals of Protection, Domain of Protection, Access Matrix, Implementation of Acess Matrix, Revocation of Access Rights, Capability- Based Systems, Language – Based Protection 6 Hours

**Security:** Security Problem, User Authentication, One – Time Password, Program Threats, System Threats, Cryptography, Computer – Security Classifications. 3 Hours

**Books for Reference:**

* Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
* Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
* Silberschatz / Galvin / Gagne, Operating System,6th Edition,WSE (WILEY Publication)
* William Stallings, Operating System, 4th Edition, Pearson Education.
* H.M.Deitel, Operating systems, 2nd Edition ,Pearson Education
* Abraham Silberschatz and peter Baer Galvin, Operating System Concepts, 8th Edition, Pearson Education 1989 (Chapter 1,3.1,3.2,3.3,3.4,3.6,4,5,6 (Except 6.8,6.9), 7, 8,9,10,11,13, (Except 13.6) 19 (Except 19.6),20(Except 20.8, 20.9), 22,23)
* Nutt: Operating Systems, 3/e Pearson Education 2004

**14BCA204 – OOP’s with C++**

**Module 1 8 Hours**

**Introduction:**

Procedure oriented versus Object Oriented Programming-characteristics of OOP, Merits and Demerits of OOP.

**Data Types:** Different data types, operators and expressions in C++, Keywords in C++.

**Input and Output:** Comparison of stido.h and iostream.h, cin and cout.

**Decision and loop:**

Conditional statement - if-else statement, nested if-else statement, switch, break, continue, Looping statements- for loop, while loop, Do-while loop.

**Arrays, String and Structures :** fundamentals-Single dimensional, multi-dimensional arrays, Basics of structures-declaring and defining structure- Accessing structure members, array of structures, Unions difference between structures and Unions.

**Module 2 16 Hours**

**Class:** Definition-defining the class, defining data members and member functions, Access specifier-private, public, protected, objects as function arguments, returning objects from the function, scope resolution operator, member function defined outside the class, difference between class and structure, array as class member data, Array of objects.

**Functions in C++:**

Function definition, function declaration, Built-in functions, user defined functions, calling the function, passing parameter-actual and formal, overload function-different types of arguments-different number of arguments, inline function, default argument.

**Constructor and Destructor:** Constructors-constructor with argument, constructor without arguments, constructor with default arguments, Dynamic constructor, constructor overloading, copy constructor, destructors, Manipulating private data members.

**Module 3 12 Hours**

**Operator Overloading:**

Defining operator overloading, overloading unary operator, overloading binary operator, manipulation of string using overloaded operator, rules for overloading operator. Data conversion: conversion between Basic types, conversion between objects & Basic types, conversion between objects of different classes.

**Inheritance:**

Base Class & derived class, defining derived classes, protected access specifier, public inheritance and private inheritance-member accessibility, constructors and destructors in derived classes, Level of inheritance-single inheritance, multiple inheritance, multi-level inheritance, hierarchical inheritance, hybrid inheritance.

**Module 4 12 Hours**

**Pointer:**

Pointer declaration and Access, memory management-new and delete, pointer to object-referencing members using pointers, this pointer, returning values using this pointer.

**Virtual function:**

Normal member functions accessed with pointers, virtual member function access, late binding, pure virtual function, abstract class, virtual base class

**Friend functions and static function:**

Purpose, defining friend functions, friend classes, static function, accessing static function numbering positive objects.

**Module 5 12 Hours**

**Console IO Operator:**

C++ stream and C++ stream classes, unformatted I/O operators, formatted I/O operators-manipulators-user defined manipulators.

**Files :** Class for file stream operators, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple object, stream class, file pointer-specifying the position, specifying the object, tellg() function, seekg() function. Command line arguments.

**Text Books:**

* E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill.
* Publications.
* Strousstrup: The C++ Programming Language, Pearson Edition, 3rd Edition
* Lafore Robert: Object Oriented Programming in Turbo C++, Galgotia Publications

**Books for Reference:**

* Lippman: C++ Primer, 3/e Pearson Education
* C++ completer reference by Herbert Schildt, Tata McGraw Hill Publications.
* Let us C++ by YeshwanthKanetkar

**14BCA205 - DATA STRUCTURES USING C**

**Module 1: Introduction to Data structures 2 Hours**

Definition, Classification of data structures: primitive and non primitive, Elementary data organization, Time and space complexity of an algorithm (Examples), String processing .

**Dynamic memory allocation and pointers 4 Hours**

Definition of dynamic memory allocation, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Meaning of static and dynamic memory allocation, Memory allocation functions: malloc(), calloc(), free() and realloc().

**Recursion: 3 Hours**

Definition, Recursion in C (advantages), Writing Recursive programs – Binomial coefficient, Fibonacci, GCD.

**Module 2: Searching 4 Hours**

**Basic Search Techniques:** Sequential search: Iterative and Recursive methods, Binary search: Iterative and Recursive methods, Comparison between sequential and binary search.

**Sort: 12 Hours Sort:** General background and definition, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort

**Module 3: Stack & Queue 8 Hours**

**Stack –** Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, Applications of stacks.

**Queue: 8 Hours**

Definition, Array representation of queue, **Types of queue**: Simple queue, Circular queue, Double ended queue (deque), Priority queue, Operations on all types of Queues

**Module 4: Linked List 9 Hours**

Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list: Singly linked list, doubly linked list, Circular linked list, Operations on singly linked list: creation, insertion, deletion, search and display.

**Module 5: Trees 10 Hours**

Definition : Tree, Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology : Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree : Array representation of tree, Creation of binary tree. Traversal of Binary Tree: Preorder, Inorder and postorder.

**Books for Reference:**

* Weiss, Data Structures and Algorithm Analysis in C, II Edition, Pearson Education, 2001
* Lipschutz: Schaum’s outline series Data structures Tata McGraw-Hill
* Robert Kruse Data Structures and program designing using ‘C’
* Trembley and Sorenson Data Structures
* E. Balaguruswamy Programming in ANSI C.
* Bandyopadhyay, Data Structures Using C Pearson Education, 1999
* Tenenbaum, Data Structures Using C. Pearson Education, 200
* Kamthane: Introduction to Data Structures in C. Pearson Education 2005.
* Hanumanthappa M., Practical approach to Data Structures, Laxmi Publications, Fire Wall media 2006
* Langsam, AusensteinMaoshe& M. Tanenbaum Aaron Data Structures using C and C++ Pearson Education.

**14BCA208 - Mind Management and Human Values**

**To be Filled Respective Department**

**14BCA207L - OOPS WITH C++ LAB**

Write a C++ Program:

1. To implement the structure.
2. To add two time variables using constructor and destructor.
3. For function overloading.
4. For operator overloading.
5. For implementation of inheritance
6. To add two complex no using friend function.
7. For pure virtual function.
8. To create file and store the information and fetch the information.

**14BCA208L-DATA STRUCTURES LAB**

**Part A**

1. Use a recursive function to find GCD of two numbers.
2. Use a recursive function to find the Fibonacci series.
3. Use pointers to find the length of a string and to concatenate two strings.
4. Use pointers to copy a string and to extract a substring from a given a string.
5. Use a recursive function for the towers of Hanoi with three discs.
6. Insert an integer into a given position in an array.
7. Deleting an integer from an array.
8. Write a program to create a linked list and to display it.
9. Write a program to sort N numbers using insertion sort.
10. Write a program to sort N numbers using selection sort.

**Part B**

1. Inserting a node into a singly linked list.
2. Deleting a node from a singly linked list.
3. Pointer implementation of stacks.
4. Pointer implementation of queues.
5. Creating a binary search tree and traversing it using in order, preorder and post order.

6. Sort N numbers using merge sort.

**III Semester BCA**

**14BCA301 -** **INFORMATION SECURITY FUNDAMENTALS**

**Module 1: Introduction to Information Security 15 Hours**

Definition of Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System; Balancing Information Security and Access; Implementing IT Security, The system Development Life cycle, Security professional in the organization.

**Module 2: The Need for IT Security 15 Hours**

Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safe guarding the technology assets; Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism; Attacks-Malicious Codes, Back Doors, Denial of Service and Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering.

**Module 3: Risk Management 15 Hours**

Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.

**Module 4: Network Infrastructure Security and Connectivity 15 Hours**

Understanding Infrastructure Security- Device Based Security, Media-Based Security, Monitoring and Diagnosing; Monitoring Network- Firewall, Intrusion Detection System, Intrusion Prevention system; OS and Network Hardening, Application Hardening; Physical and Network Security- Policies, Standards and Guidelines.

**Books for Reference:**

* Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach, 2012
* Operating System Concepts, 8th Edition by Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Pub: John Wiley & sons, Inc., 2009.
* Information security: Principles and Practice - Mark Stamp, 2nd Edition, Pub: John Wiley & Sons, Inc., 2011

**14BCA302 - SOFTWARE ENGINEERING**

**Module 1: Software Product and Process** **10 Hours**

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models – System Engineering – Computer Based System – Business Process Engineering, Overview – Product Engineering Overview.

**Module 2: Software Requirements** **10 Hours**

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

**Module 3: Analysis, Design Concepts and Principles**  **15 Hours**

Systems Engineering - Analysis Concepts - Design Process And Concepts – Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring And Control System.

**Module 4: Testing** **15 Hours**

Taxonomy of Software Testing – Types Of S/W Test – Black Box Testing – Testing Boundary Conditions – Structural Testing – Test Coverage Criteria Based On Data Flow Mechanisms – Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques

**Module 5: Software Project Management** **10 Hours**

Measures And Measurements – ZIPF’s Law – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Scheduling – Earned Value Analysis – Error Tracking – Software Configuration Management – Program Evolution Dynamics – Software Maintenance – Project Planning – Project Scheduling– Risk Management – CASE Tools

**Text Books:**

* Ian Sommerville, “Software engineering”, Seventh Edition, Pearson Education Asia, 2007
* Roger S. Pressman, “Software Engineering – A practitioner’s Approach”, Sixth Edition, McGraw-Hill International Edition, 2005.

**14BCA303 - RDBMS**

**Module 1: Introduction** **10 Hours**

Purpose of Database System -– Views of data – Data Models – Database Languages –– Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model ) – E-R Diagrams -- Introduction to relational databases

**Module 2: Relational Model** **20 Hours**

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals

Oracle data types, Data Constraints, Column level & table Level Constraints, working with Tables.

Defining different constraints on the table, Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching, Oracle Function, Grouping data from Tables in SQL, Manipulation Data in SQL.

Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), Sub queries Union, intersect & Minus Clause, Creating view, Renaming the Column of a view, Granting Permissions, - Updating, Selection, Destroying view Creating Indexes, Creating and managing User

Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

**Module 3: Database Design** **20 Hours**

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

**Module 4: Transactions** **10 Hours** Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

**Text Books:**

* Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006
* Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Pearson/Addision Wesley, 2007.
* Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003.

**14BCA304 - COMPUTER NETWORKS**

**Module 1: Networking Fundamentals** **12 Hours**

Basics of Network & Networking, Advantages of Networking, Types of Networks, Network Terms- Host, Workstations, Server, Client, Node, Types of Network Architecture- Peer-to-Peer & Client/Server, Workgroup Vs. Domain. Network Topologies, Types of Topologies, Logical and physical topologies, selecting the Right Topology, Types of Transmission Media, Communication Modes, Wiring Standards and Cabling- straight through cable, crossover cable, rollover cable, media connectors (Fibre optic, Coaxial, and TP etc.) Introduction of OSI model, Seven layers of OSI model, Functions of the seven layers, Introduction of TCP/IP Model, TCP, UDP, IP, ICMP, ARP/RARP, Comparison between OSI model & TCP/IP model. Overview of Ethernet Addresses

**Module 2: Basics of Network Devices 12 Hours**

Network Devices- NIC- functions of NIC, installing NIC, Hub, Switch, Bridge, Router, Gateways, And Other Networking Devices, Repeater, CSU/DSU, and modem, Data Link Layer: Ethernet, Ethernet standards, Ethernet Components,Point-to-Point Protocol(PPP ),PPP standards, Address Resolution Protocol, Message format, transactions, Wireless Networking: Wireless Technology, Benefits of Wireless Technology, Types of Wireless Networks: Ad-hoc mode, Infrastructure mode, Wireless network Components: Wireless Access Points, Wireless NICs, wireless LAN standards: IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, wireless LAN modulation techniques, wireless security Protocols: WEP,WPA, 802.1X, Installing a wireless LAN

**Module 3: Basics of Network, Transport and Application Layers 12 Hours**

Network Layer: Internet Protocol (IP ), IP standards, versions, functions, IPv4 addressing, IPv4 address Classes, IPv4 address types, Subnet Mask, Default Gateway, Public & Private IP Address, methods of assigning IP address, IPv6 address, types, assignment, Data encapsulation, The IPv4 Datagram Format, The IPv6 Datagram Format, Internet Control Message Protocol (ICMP ), ICMPv4, ICMPv6, Internet Group Management Protocol (IGMP ),Introduction to Routing and Switching concepts, Transport Layer: Transmission Control Protocol(TCP), User Datagram Protocol (UDP), Overview of Ports & Sockets, Application Layer: DHCP, DNS, HTTP/HTTPS, FTP, TFTP, SFTP, Telnet, Email: SMTP, POP3/IMAP, NTP

**Module 4: WAN Technology 12 Hours**

What Is a WAN?, WAN Switching, WAN Switching techniques Circuit Switching, Packet Switching etc., Connecting to the Internet : PSTN, ISDN, DSL, CATV, Satellite-Based Services, Last Mile Fiber, Cellular Technologies, Connecting LANs : Leased Lines, SONET/SDH, Packet

Switching, Remote Access: Dial-up Remote Access, Virtual Private Networking, SSL VPN, Remote Terminal Emulation, Network security: Authentication and Authorization, Tunneling and Encryption Protocols, IPSec, SSL and TLS, Firewall, Other Security Appliances, Security Threats

**Module 5: Network Operating Systems and Troubleshooting Network 12 Hours**

Network Operating Systems: Microsoft Operating Systems, Novell NetWare, UNIX and Linux Operating Systems, Macintosh Networking, Trouble Shooting Networks: Command-Line interface Tools, Network and Internet Troubleshooting, Basic Network Troubleshooting : Troubleshooting Model, identify the affected area, probable cause, implement a solution, test the result, recognize the potential effects of the solution, document the solution, Using Network Utilities: ping, traceroute, tracert, ipconfig, arp, nslookup, netstat, nbtstat, Hardware trouble shooting tools, system monitoring tools

**Books for Reference:**

* CCNA Cisco Certified Network Associate: Study Guide (With CD) 7th Edition (Paperback), Wiley India, 2011
* CCENT/CCNA ICND1 640-822 Official Cert Guide 3 Edition (Paperback), Pearson, 2013
* Routing Protocols and Concepts CCNA Exploration Companion Guide (With CD) (Paperback), Pearson, 2008
* CCNA Exploration Course Booklet : Routing Protocols and Concepts, Version 4.0 (Paperback), Pearson, 2010

**14BCA305 - PROGRAMMING in JAVA**

**Learning outcome:**

Java is strong web development tool, which the, students will learn to further understand various aspects of web application developments and enable them to develop their own sites and web applications.

**Module 1: Introduction** **5 Hours**

History, Overview of Java, Object Oriented Programming, A simple Programme, Two control statements - if statement, for loop, using Blocks of codes, Lexical issues - White space, identifiers, Literals, comments, separators, Java Key words. Data types: Integers, Floating point, characters, Boolean, A closer look at Literals, Variables, Type conversion and casting, Automatic type promotion in Expressions Arrays.

**Operators: 5 Hours**

Arithmetic operators, The Bit wise operators, Relational Operators, Boolean Logical operators, Assignment Operator, Operator Precedence. Control Statements: Selection Statements - if, Switch: Iteration Statements - While, Do-while, for Nested loops, Jump statements.

**Module 2: Classes** **21 Hours** Class Fundamentals, Declaring objects, Assigning object reference variables, Methods, constructors, “this” keyword, finalize ( ) method A stack class, Over loading methods, using objects as parameters, Argument passing, Returning objects, Recursion, Access control, Introducing final, understanding static, Introducing Nested and Inner classes, Using command line arguments.

Inheritance: Inheritance basics, Using super, method overriding, Dynamic method Dispatch, using abstract classes, using final with Inheritance.

**Module 3: Packages** **7 Hours**

Definition, Access protection importing packages, Interfaces: Definition implementing interfaces.

Exception Handling: Fundamental, Exception types, Using try and catch, Multiple catch clauses, Nested try Statements, throw, throws, finally, Java’s Built - in exception, using Exceptions.

**Module 4: Multithreaded Programming 14 Hours**

The Java thread model, The main thread, Creating a thread, Creating multiple thread, Creating a thread, Creating multiple threads, Using isalive() and Join(), Thread - Priorities, Synchronization, Inter thread communication, suspending, resuming and stopping threads, using multi threading.

1/0 basics, Reading control input, writing control output, Reading and Writing files, Applet Fundamentals, the AWT package,AWT Event handling concepts The transient and volatile modifiers, using instance of using assert.

**Module: 5 JAVA Database Connectivity (JDBC)** **08 Hours**

Database connectivity: JDBC architecture, JDBC Drivers, the JDBC API: loading a driver, connecting to a database, Creating and executing JDBC statements, Handling SQL exceptions, Accessing result sets: Types of result sets, Methods of result set interface. An example JDBC application to query a database.

**Books for Reference:**

* The complete reference Java –2: V Edition by Herbert Schildt Pub. TMH.
* SAMS teach yourself Java – 2: 3rd Edition by Rogers Cedenhead and Leura Lemay Pub. Pearson Education.

**14BCA306 - INDIAN CONSTITUION**

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**14BCA307L - RDBMS LAB**

1. SQL Commands
   1. Data Definition Language commands,
   2. Data Manipulation Language commands,
   3. Data Control Language commands and
   4. Transaction Control Language commands
2. Select Statements with all clauses/options
3. Nested Queries
4. Join Queries
5. Views
6. Joins: Equijoins, Non-Equijoins, Joining Two Tables, Self Joins, Left Outer Joins, Right Outer Joins, Full Outer Joins, Natural Joins
7. Create a Table called Student (Student\_id, Sname, DepNo, email) and insert at least ten tuples
8. Create one simple view on student database which contains all students records belong to department BCA
9. Try to insert one row data through the view and verify it in the base table
10. Perform below specified operations with the above table.
    * 1. Rename the table.
      2. Add one column (sex) to that table which contains either M or F.
      3. Drop column from the table.
      4. Drop the table.

**14BCA308L - JAVA PROGRAMMING LAB**

**List of Programs**

**Part A**

1. Write a program to check whether two strings are equal or not.
2. Write a program to display reverse string.
3. Write a program to find the sum of digits of a given number.
4. Write a program to display a multiplication table.
5. Write a program to display all prime numbers between 1 to 1t000.
6. Write a program to insert element in existing array.
7. Write a program to sort existing array.
8. Write a program to create object for Tree Set and Stack and use all methods.
9. Write a program to check all math class functions
10. Write a program to execute any Windows 95 application (Like notepad, calculator etc)
11. Write a program to find out total memory, free memory and free memory after executing garbage Collector (gc).

**Part B**

1. Write a program to copy a file to another file using Java to package classes. Get the file names at run time and if the target file is existed then ask confirmation to overwrite and take necessary actions.
2. Write a program to get file name at runtime and display number f lines and words in that file.
3. Write a program to list files in the current working directory depending upon a given pattern.
4. Create a textfileld that allows only numeric value and in specified length.
5. Create a Frame with 2 labels, at runtime display x and y command-ordinate of mouse pointer in the labels.

**14BCAVFX401 - Visual Design**

**Course Objectives:**

* To introduce students to the methods and means to create images using the elements of design – space, depth, overlaps, transparency, plane, volume etc..
* Sensitivity to the process of image making for application in specific contexts – viewer or user.
* Provide students with the tools and language to construct images independently using craft skills –understanding of line, shape, form, colour and their use and representation techniques.
* To give them Idea of proportion, scale and other elements involved in principles of composition

**Block I: BASIC CONCEPTS OF 2D/3D ART**

**Module 1:**  **Introduction to art and ideas**. **5 Hours**

Visual & Critical thinking. Principles of Gestalt Theory- Gestalt Laws of Perceptual Organization Study of Photographs/ Analysis of Master works

**Module 2:** **visual elements** **5 Hours**

Line and shape, Form, texture, color, value and pictorial space.

**Module 3: Drawing from real life.**  **5 Hours**

Observing the visual elements from the Real life and creating simple drawings of objects, buildings, interiors, Figures etc.

**Module 4: Perspective drawings 5 Hours**

Rules of Perspectives. One point, two point and three point perspectives

**Module 5: Design 5 Hours**

Principles of Design. Unity and variety / element of interest, contrast, elaboration, Dominance, Expressive content. Color and composition – Balance, Harmony and rhythm .color and mood in composition

**Module 6: Composition**  **5 Hours**

Composition: Picture Space .scale. Principles of composition: Harmony, Balance, Rhythm, Repetition, Visual linking – shared edges, overlapping, Design involved in motion Picture. Set and prop designs for specific contexts

**Learning Lab:**

1. Creating simple Designs using basic Elements ; Line and shape, Form, value, texture, color
2. Simple compositions using different shapes, overlapping, repeating the shapes
3. To draw perspective drawings of one, two and three points of furniture, objects, exteriors.
4. To create Compositions from various visual elements from life using Harmony, Balance, Rhythm, Repetition, Visual linking – shared edges, overlapping
5. To create different Design Compositions using element of interest, contrast, elaboration, Dominance, Expressive content. Color and Balance, Harmony and rhythm .color and mood in composition

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Foundation Art Studio, Software:** Adobe Photoshop, Adobe Illustrator, Adobe Flash |

**Text Books:**

* Design for Communication: Conceptual Graphic Design Basics - Elizabeth Resnick, Publisher: Wiley; 1st Edition, June 10, 2003
* Visual Language , the Hidden Medium of Communication (Design Fundamentals) - Peter Bonnici, Publisher: Rotovision, March 1, 1999
* Design for Communication: Conceptual Graphic Design Basics by Elizabeth Resnick,

I Publisher: Wiley; 1st Edition, June 10, 2003 I

* Visual Language - The Hidden Medium of Communication (Design Fundamentals)

By Peter Bonnici. I Publisher: Rotovision, March 1, 1999 I

**Books for Reference:**

* Principles of Form and Design - Wucius Wong I Publisher: John Wiley & Sons, New York2, September 15, 1993 I
* Principles of Color Design - Wucius Wong I Publisher: Wiley, September 26, 1996 I
* Principles of Form and Design by Wucius Wong

I Publisher: John Wiley & Sons, New York2, September 15, 1993. I

* Principles of Color Design by Wucius Wong.

I Publisher: Wiley, September 26, 1996 I

**14BCAVFX402 - Digital Art Lab - I**

**Course Objectives:**

The purpose of this subject is to provide the students with training methodologies and specific industry skills that will assist them in developing creative ideas into digital art with emphasis on image manipulation, matte painting and fundamental digital 2D animation.

The students will receive information that will enable them to:

* Understand the design principles used in creation of digital art.
* Familiarize with the terminologies and concepts for creating and manipulating digital images.
* To be proficient in using image editing and digital 2D animation tools and software’s.
* Understand the concept of creating textures, brushes, abstract and thematic designs.
* Create effective typography designs used for raster and vector illustrations and designs.
* Construct characters using flash symbols and rig it for animation.
* Animate background layouts and characters using 2D animation principles.

**Module 1 6 Hours**

Digital Image and File Formats: Monitor resolution, Image resolution, Resolution for printing, Resolution for display, Pixilation, Interpolation. Colour representation in computers: RGB, HLS, CMYK, Greyscale, Colour pallets. Graphics packages Image formats Vector Formats Pixel format.

**Module 2: Introduction to Photoshop 6 Hours**

Introduction to Adobe Photoshop Interface, Image manipulation, Collages

**Module 3** **6 Hours**

Digital Painting, Object based painting, Environment based painting, Abstract painting, Realistic painting

**Module 4: Working with Flash 6 Hours**

Introduction to Flash Environment -Drawing in Flash - Basic key frame animation, Loopable animation

**Module 5 6 Hours**

Path Based Animation, Animated scenes, Character based animation.

**Learning Lab:**

1. Creating Collages using images
2. Speed Painting Exercise No 1. Still Life Objects 2.Organic Objects 3. Interiors 4. Exteriors 5. People and Animals
3. Matte Painting Exercise No 1. Prehistoric Setting, 2. Fantasy World, 3. Futuristic World
4. Retouching and Repairing Old Photographs
5. Keyframe Animation Exercise : Keyframe Animation,
6. Creating Scenes for animation in Flash
7. Using Photoshop as an artistic tool-Colour, Symbolism, Ink and Painting, Colorizing, Artistic Filters.
8. Abstract Design-Creating Abstract and Thematic Designs, Creating Abstract Brushes, Multilayered Background Design using Blend Modes.
9. Typography (Text Design), Perspective Transformation, Color Corrections, Color Blend, Concept Art, Vectore art, Character Vactor art
10. Layout Design and Animation-Background Composition, Background colouring

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Photoshop, Adobe Flash |

**Text Books:**

* Principles of Form and Design by Wucius Wong, Publisher: John Wiley & Sons, New York2, September 15, 1993.
* Adobe Photoshop CS6 Classroom in a Book by Adobe Creative Team, Publisher: Adobe Press, June 1, 2012.
* Adobe Flash Professional CS6 Classroom in a Book by Adobe Creative Team, Publisher Adobe Press, March 24, 2012.

**Books for Reference:**

* Principles of Two-Dimensional Design - Wucius Wong I Publisher: Wiley I
* The Animation Bible: A Practical Guide to the Art of Animating from Flipbooks to Flash - Maureen Furniss

**14BCAVFX403 - 3D Lab -I**

**Course Objectives:** The Objective of this subject is to learn the fundamentals of 3D design and animation.

**Block I:**

**Module 1: Concept of 3D modelling                                                               3 Hours**

Understanding the 3 Dimensions, Isometric & Orthographic projection, difference between 2D & 3D and xyz coordinates.  Introduction to Maya interface, modeling tools & techniques.

**Module 2: Shading & Texturing 4 Hours**

Understanding nature of different materials and achieving different types of texture surfaces such as wood, glass, etc; Understanding bitmap and procedural mapping, Understanding 2D and 3D texture types in Maya -Creating bump, displacement and normal maps, Utility node, Concepts of UV unwrapping.

**Module 3: Lighting Theory, Light Types & Shadows  4 Hours**

Lighting Theory, Studying Light and Surfaces, Natural and artificial light study, Color, Aesthetics and mood, Roll of lighting in visual composition.

Light types, Attributes of Light Shadows and their functions, ***Shadow types,*** Depth mapped shadows, Raytraced shadows

**Module 4: Art of Lighting & Rendering 4 Hours**

Understanding the Art of Lighting – 1, 2, 3point lighting, indoor lighting, product lighting

Concepts of Rendering -Formats and aspect ratios -Render settings - Rendering

**Block II:**

**Module 1: Introduction to 3D Animation                                            3 Hours**

Introduction 3D Animation and types, Graph editor and Dope sheet

**Module 2: Animation Principles & deformers                                                                4 Hours**

Objection Animation and deformers, applying the principles of animation.

**Module 3: Introduction to Rigging**                                                             **4 Hours**

Rigging Basics - Bones and Joints, Skin, Binding Kinematics (IK & FK). Joints and hierarchies Concept of Skeleton

**Module 4: Rigging controls                                                                            4 Hours**

Rigging the controls - IK and FK, , Connect Joint, Remove, joint, Insert joint, Re-root joint Mirror, Joint, Set preferred angle, Assume preferred angle

**Learning Lab:**

1. Model minimum of 10 scene elements props with textures.
2. Model any environment with complete scene elements and props.
3. Rig a cartoon vehicle for animation
4. Rig a mechanical model for animation
5. Path animation- Creating a Path Animation -The Attach To Path Options Window
6. Rig a car model for animation
7. Rig to control multiple models constrains using one controller.
8. Character Animation

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Autodesk Entertainment Suite |

**Text Books:**

* 3D Animation Essentials - Andy Beane   I Publisher: Sybex, March 6, 2012 I
* Introducing Autodesk Maya 2013 - Dariush Derakhshan   I Publisher : Sybex, May 1, 2012 I

**Books for Reference:**

# Understanding 3D Animation Using Maya - John Edgar Park

* Basics Animation: Digital Animation - Andrew Chong
* The Animator's Survival Kit--Revised Edition: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Interne - Richard Williams

 I Publisher: Faber Faber I

**14BCAVFX404 - Compositing Techniques – I**

**Course Objectives:**

The students will receive information that will enable them to:

* Familiarize the Concepts and techniques used in compositing
* To familiarize in Advanced and In-Depth Compositing

**Block I: Basic Compositing**

**Module 1** **6 Hours**

Layer and Node based compositing, Blending layers, Matte Image, Masking, Morphing - Chroma Keying, Garbage Mattes, Edge Mattes, Luminance Keying, Chrominance Keying, Difference Matting, Plug-ins and tools for keying.

**Module 2** **6 Hours**

Tracking and Stabilization, Tracking an element, 2D tracking, Perspective tracking, Stabilizing footage, Limitations of tracking and stabilizing tools, Tools for advanced tracking and match moving. Digital Imagery, Color Correction

**Block II: Advanced Compositing**

**Module 1** **6 Hours**

Creating elements, Lighting in compositing tool, Matching live and virtual cameras. 3D Compositing, **Vanishing point conversion**, creating 3D compositing using 2D images, Working with camera and lighting, effects

**Module 2** **6 Hours**

Working with Multipass Rendering, Alpha and Luma mattes, Z depth maps, Blending passes and effects. Animation, 2D and 3D transformation, Temporal and spartial interpolation, speed graph, optimizing key frames, expressions for animation, Time Remapping

**Module 3 6 Hours**

**Theory and Practice of Video Art -**  History of Video Art, Contemporary video style, culture and emotion reference - Video synthesizer, realtime video art, tools and techniques, applications - music visualization and media art, automation to music, applications and tools - Video art as art form, Interactive film, display and projection, case studies

**Learning Lab:**

1. Create 2.5D Animation of an exterior and interior scene.
2. Animate a slideshow using images imported into compositing.
3. Track and composite chroma footage to a background, color correct the scene for film.
4. Animate and composite 3D rendered passes with 2D footages.

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Master Collection, Autodesk Entertainment Suite, Foundry Nuke, Imaginer Systems Mocha Pro, 2D3 Boujou |

**Text Books:**

* The Art and Science of Digital Compositing, Second Edition: Techniques for Visual Effects, Animation and Motion Graphics - Ron Brinkmann I Publisher : Morgan Kaufmann; 2 edition (June 4, 2008) I
* Adobe After Effects CS6 Classroom in a Book - Adobe Creative Team I Publisher : Adobe Press, June 25, 2012 I

**Books for Reference:**

* Compositing Digital Images - T. Porter and T. Duff I Proceedings of SIGGRAPH '84, 18 (1984) I
* The Art and Science of Digital Compositing - Ron Brinkmann
* Wright'sCompositing Visual Effects: Essentials for the Aspiring Artist [Paperback]2007) - Paperback (2007) - S.Wright
* Compositing Visual Effects – Essentials for aspiring artists - Steve Wright

**14BCAVFX405 - VFX Pre-Production**

**Course Objectives:**

To impart skills in visualizing a VFX sequence, plan to execute the VFX idea and create the sequence pre-visualization.

**Block I**

**Module 1** **12 Hours**

The Evolution of the Art – Theoretical Analysis – Hollywood – Pioneers of Vfx. 1970s - George Lucas - Stephen Spielberg – Industrial Lights & Magic – Indian Vfx history. Putting Digital Realm on the Map – 1990s Enthralling CGI – Changing the Lingo – Massive Lords - Avatar Box - The State of the Art

**Module 2 12 Hours**

Script Analysis and Break down – VFX sequence duration – Shot visualization - Complexity Analysis. What is Storyboard, Importance of Story Board,

**Module 3 12 Hours**

Anatomy and Aspects of a Storyboard, Thumbnail Storyboard, Preparing Storyboards using Digital software

**Module 4 12 Hours**

Composition, The Rule of third,Story Map, the 180 degree Rule, Spatial and temporal Continuity , Shots, Scene, Sequence Colored Storyboard Techniques, Camera Shots and Camera Moves and their meaning, Transitions .

**Module 5 12 Hours**

Pre-Viz - Shot execution Planning - Production Notes

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| **Teaching Pedagogy:** Lecture Demonstration |
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**Text Books:**

# The Visual Effects Producer: Understanding the Art and Business of VFX - Susan Zwerman, Publisher: Focal Press (2010)

* Professional Storyboarding: Rules of Thumb - Sergio Paez, Anson Jew, Publisher : Focal Press, December 21, 2012
* VFX and CG Survival Guide for Producers and Filmmakers (VFX and CG Survival Guides) (Volume 1) Publisher: Create Space Independent Publishing Platform; 001 edition (April 2, 2013)
* Special Effects: The History and Technique – Richard Rickitt.
* I Billboard Books I 2nd edition, 2007 I
* The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures – Jeffrey A. Okun & Susan Zwerman.
* I Publisher: Focal Press 2010 I
* Industrial Light & Magic: The Art of Innovation Publisher – Abrams
* I (November 1, 2011) I

**Books for Reference:**

* Comics and Sequential Art - Will Eisner
* The Art of Storyboard - John Hart
* Digital Storytelling: The Narrative Power of Visual Effects in Film – McClean, Shilo T.
* I (2007) I The MIT Press I
* Compositing Digital Images – T. Porter and T. Duff.
* I Proceedings of SIGGRAPH '84, 18 (1984) I

**14BCAVFX406 – Cinematography**

**Course Objectives:**

To provide technical information and appreciation of cinematography and editing, lighting, the art of presentation, sound, criticism and theories.

**Block I**

**Module1: The Art of Cinema - Cinematography 5 Hours**

Colour – contrast and Light**,** Focus –Exposure – Rate

**Module 2 5 Hours**

Framing**,** Scale**,** Camera & movement**,** Case study Alfred Hitchcock

**Module 3: The Art of Presentation 6 Hours**

1. **Editing:** Devices - Transitions**,** Matches - Various visual matches and match on action**,** Duration – Rhythm**,** Styles
2. **Editing Tools & Techniques :** Digital Conversion, Capturing video, EDL, Splice and Slicing Edit, Title Design, Export techniques

**Module 4 5 Hours**

Continuity in visual narration -Montage-Elliptical & Other visual devises in narration

**Block II**

**Module 1: Introduction To Camera 6 Hours**

Camera (definition), Physical camera, Film camera, Still camera, Motion picture camera, Digital camera, CG /Virtual Camera, Framing, Angle of Framing, Aspect ratio, Visual Composition

HUMAN EYE VS CAMERA

WORKING OF A FILM CAMERA

Working with Camera Exposure control Focus Image capture

**Module 2: Principles And Concepts Of Camera 6 Hours**

Angle of view, Aperture, Circle of confusion, Colour temperature: , Depth of field, Depth of focus, Double exposure, Exposure, Exposure value, F-number , Film format, Pinhole camera Red-eye effect, Rule of thirds, Shutter speed.

**Module 3: Cinematography 6 Hours**

Aspects of cinematography, Lens, Zoom, Focal length, Lighting, Special effects, Frame rate selection, Role of the cinematographer, Evolution of technology: new, Camera Shots, Extreme long shot, Long shot Medium shot Closeup, Extreme close-up. Shooting for VFX shot: Green Screen studio design, capturing green screen shots, Lighting shots, Planning and techniques, Short and location notes DIGITAL CINEMATOGRAPHY (Visual Effects) :Simulating real world camera in CG, Pinhole camera, Lens-based camera, Camera movement,CG camera/software camera, Camera effects, Angle of view and film back, Film gate, Problems face with CG Camera (Dos and don’ts, Camera walk-through.

**Module 4: Camera Movement 6 Hours**

Cameras and perspective, Angle of view and perspective Vanishing point and perspective Framing the shot, Camera positions, Animating a virtual camera, Zooming and dolly, Depth of field, Planning animation cinematography and shot structure to communicate mood, Tripods and Dolly, Cranes, Motion Camera.

**Learning Lab:**

1. Edit a narrative short using the editing theories and techniques.
2. Edit an action based short using cinematography and editing theories.
3. Shoot and edit a complete VFX shot with animated title and end credits.

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software Requirement:** Camera Filming Studio, Software: Adobe Master Collection |

**Text Books:**

* Cinematography: Theory and Practice: Image Making for Cinematographers and Directors b - Blain Brown, Publisher: Focal Press, July 18 2011

# The Filmmaker's Eye: Learning (and Breaking) the Rules of Cinematic Composition - Gustavo MercadGustavo Mercado (Author) › [Visit Amazon's Gustavo Mercado Page](http://www.amazon.com/Gustavo-Mercado/e/B004CRY4AY/ref=ntt_athr_dp_pel_pop_1)Find all the books, read about the author, and more.Gustavo Mercado (Author)

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Are you an author? [Learn about Author Central](http://authorcentral.amazon.com/gp/landing/ref=ntt_atc_dp_pel_1)

# Reference:

# Motion Picture and Video Lighting - Blain Brown

# Film Editing: Great Cuts Every Filmmaker and Movie Lover Must Know - Gael Chandler

**14BCAVFX501 - 3D Lab – II**

**Course Objectives:**

* The Objective of this subject is to explore the 3D environment in more detail. It covers advanced tools and techniques to create more complex organic and inorganic objects in detail.
* To learn Advanced techniques in rigging and animation.

**Block I: Modelling**

**Module 1: Working with Polygon modeling tools & techniques 3 Hours**

Understanding nature of polygons, learning different polygon mesh editing tools, components, converting from Polygon to nurbs and sub-divisions, normals etc;

**Module 2: Working with Nurbs modeling tools & techniques** **3 Hours**

Understanding nature of Nurbs surface, curves, components, learning nurbs mesh, editing tools, creating mesh through the curves, converting from nurbs to polygon and sub-division etc;

**Module 3: Working with Sub-division modeling tools & techniques 3 Hours**

Understanding nature of Sub-division mesh, components, learning different Sub-division mesh editing tools, converting from Sub-division to Nurbs and Polygons etc;

**Module 4: Working with environment 3 Hours**

Creating an environment by using all the different types of geometrys, aligning. Adding annotation etc;

**Block II: Texturing**

**Module 1: Working with unwrapping complex model 3 Hours**

Finding how to unwrap a complex and multiple models and utilizing the UV texture space efficiently, understanding 0 to +1 texture coordinates

**Module 2: Working with basic materials 3 Hours**

Understanding nature of different materials and achieving different types of texture surfaces such as wood, glass, etc;

**Module 3: Understanding bitmap and procedural mapping 3 Hours**

Understanding how to use a procedural map by using in built resources in maya and creates a bitmap by using images

**Module 4: Assigning different maps to an object 3 Hours**

Learning how to assign maps such as diffuse, bump, specular to an object

**Block III: 3D Animation**

**Module 1: Object Animation 3 Hours**

Motion and Idea based animation

**Module 2: Advanced Mechanics of motion – Characters** **3 Hours**

Object – Character Interaction. Character – Character. Interaction – Simple to complex

**Module 3: Advanced Mechanics of motion – Character& Props 3 Hours**

Character using whip, axe, sword, hammer etc. Pushing, pulling, lifting weights etc

**Module 4: Advanced Mechanics of motion – Characters and Rigs 3 Hours**

Climbing a cliff, rope, wall etc.

**Block IV: Rigging**

**Module 1: Rigging 3 Hours**

IK handle tool, IK Solvers, RP, SC, IK Spline, IK controls IK handle End effectors Using locators

**Module 2: Rigging 3 Hours**

Orientation of joints, Orientation script, Joint limits & damping, Stickiness

Switching between IK/FK, Adding the controls and attributes, Grouping and Parenting

**Module 3: Rigging 3 Hours**

Rigging a arm and hand, Simple rig, Advanced rig, Constraints, Point, Aim, Orient, Scale, Parent

Geometry, Normal, Tangent, Pole vector, Remove target, Set rest position, modifying axis

**Learning Lab:**

1. Model any environment with complete scene elements and props.
2. Model and texture an vehicle with detail
3. Model minimum of 20 props for animation and compositing
4. Rig a car model for animation
5. Rig a character for animation
6. Path animation- Creating a Path Animation -The Attach To Path Options Window
7. Character Animation – Creating Poses
8. Posing - Normal and Extreme poses - Old people, Martial artist, Dancer, Skater

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Autodesk Entertainment Suite |

**Text Books:**

* 3D Animation Essentials - Andy Beane I Publisher: Sybex, March 6, 2012 I
* Introducing Autodesk Maya 2013 - Dariush Derakhshan I Publisher : Sybex, May 1, 2012 I

**Books for Reference:**

* The Animation Bible: A Practical Guide to the Art of Animating from Flipbooks to Flash Maureen Furniss
* Inside Maya 5 - Erick Miller
* Cartoon Animation (The Collector's Series) [Paperback], Preston Blair
* Learning Maya | Character Rigging and Animation Alias|Wavefront
* Maya Character Creation: Modeling and Animation Controls, Chris Maraffi

**14BCAVFX502 - Matte Painting**

**Course Objectives:**

To impart Knowledge and Technical skills in creating BG. Matte Paintingsfor Animation/ and live action films

**Module 1** **6 Hours**

Introduction – History of Matte Painting, Matte painting in early cinema- front, rear & latent image projections, Digital Matte Painting- Paint v/s pixel - Analyzing work

**Module 2 6 Hours**

Setting Digital tools- Photoshop panels-To work with layers**-** Using custom brushes –Working with Image based Brushes

**Module 3 8 Hours**

Composition and concepts- Visual elements –colour – light and textures and Basic Principles- Perspective study, projections in space.

**Module 4 5 Hours**

Study of dark and light spaces – cast shadows – create seamless effects of realistic / semi realistic,

**Module 5** **5 Hours**

Fantasy and symbolic visuals using paintings, photographs

**Learning Lab:**

1. To create Landscapes, cityscapes, Buildings, Interiors and exteriors, Objects, Ancient Architectures, pavilions, parks etc. [ 8hrs]
2. Blending two or more images to create entirely new and imaginative [ 6hrs]
3. Compositions at various eye levels and perspectives moods and sensual emotions in paintings using various colour concepts, depth, illusion of space in paintings[ 8hrs]
4. Matte painting techniques and concepts for 3D scenes [ 8hrs]

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Master Collection, Autodesk Entertainment Suite |

# Text Books:

* The Invisible Art: The Legends of Movie Matte Painting - Bargain Price, Publisher: Chronicle Books (November 2002).
* Beginner's Guide to Digital Painting in Photoshop - Nykolai Aleksander , Richard Tilbury, 3DTotal Team, Publisher: 3DTotal Publishing (January 31, 2012)

# Books for Reference:

# The Invisible Art: The Legends of Movie Matte Painting - Mark Cotta Vaz (Author), Craig Barron (Author)

# The Digital Matte Painting Handbook - David B. Mattingly

**14BCAVFX503 - 3D Dynamics –I**

**Course Objectives:**

The student will be trained in the following.

* Understand and formulate the dynamic simulations to be created.
* To create simple dynamic simulations of object collisions and destructions.
* To create particle simulations for simulating liquids and gas.

**Block I: Fundamental and Maya Dynamics**

**Module 1 11 Hours**

Introduction to Applied Physics and Quantam mechanics, Kinetic Motion, Energy Conversion, Quantum Physics

**Module 2 12 Hours**

Introduction to special effects –– Rigid bodies – Active and passive rigid bodies -Physics based procedural animation using rigid bodies Collisions – Normals – Fields and its attributes – Simulation of fields

**Module 3 12 Hours**

Particles – Emitters – Emitter types and attributes - Deflectors and its attributes Simulating particle effects

**Module 4 10 Hours**

Goals – Soft Bodies – Animating soft bodies - Springs– Simulating special effects – vortex - gravity – lighting – rain

**Learning Lab:**

1. Create dynamic simulations of objects colliding with each other.
2. Create dynamic simulations of exploding objects in scene.
3. Create particle simulation to simulate different liquid properties.
4. Create dynamic and particle simulations to simulate nature elements like rain, vortex, fire etc
5. Create dynamic simulations of object bouncing and contracting through force.

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Master Collection, Autodesk Entertainment Suite |

# Text Books:

* Maya Studio Projects: Dynamics - Todd Palamar I Publisher : Sybex, November 2, 2009

# The Art of 3D Computer Animation and Effects - Isaac Kerlow I Publisher - Wiley, April 13, 2009 I

**14BCAVFX504 - Photorealistic Lighting and Rendering**

**Course Objectives:**

To provide practical knowledge in Advanced rendering engine using 3D application. To impart application and design skills for creating photorealistic lighting and Rendering

**Block I**

**Module 1 6 Hours**

Surface Principles and qualities, Maya Shaders, Hands on Creating a new custom shader.

**Module 2 8 Hours**

Materials development, working with materiel shader utility nodes, Mental ray Features - Working with Mentalray Mi Materials and Phenomenal shaders.

**Module 3 6 Hours**

Optical Illusion, Understanding Lighting, Color and Composition, Light study, Aesthetics and mood, Working with Light Shader Utility nodes

**Module 4** **10 Hours**

In-direct Lighting Techniques, Role of area Light in the photorealistic imagery, Final gather & Global illumination, Photon mapping, caustics, Sub-Surface Scatter

**Block II**

**Module 1 10 Hours**

Image Based Lighting, Creating HDRI Maps, and Digitizing HDRI Maps for Virtual Sets, Lighting with HDRI Maps, Mental Ray Lights, Volumetric nodes, Lenses, Shadow, XPasses.

**Module 2 8 Hours**

Artificial Lighting, Natural Lighting, Using IES light Modules.

**Module 3 6 Hours**

Production Workflow, Sequence Light Rig.

**Module 4 6 Hours**

Maya software render setting and features, Mental ray render Setting and features, Scene Management & optimization, Reducing the render time of Indirect lights, Preparing for rendering, Render settings window, Vector rendering, Toon shading. Multi-pass Rendering.

### Learning Lab:

1. Using Maya shader create custom material for Plastic, Metal, Clay, Glass, Rock
2. Using MentalRay shaders create custom material for Plastic, Metal, Rock,  Clay, Glass, water
3. Using Mental Ray SSS create a Shading for a Character and Wax Object - Light the object  and render the output
4. Create a custom shading network for a character using various utility and sampler nodes like Facing ratio, Gamma correction etc.
5. Create a caustic effect for a Glass object
6. Create Daylight effect for an indoor scene.
7. Create nightlight effect for an indoor scene.
8. Create different mood lighting for a character.
9. Create outdoor Lighting using Indirect lighting techniques Physical sun and sky, HDRI-  HDRI rendering techniques.
10. Creates various passes for the scene and Character - composite all the required passes and produces final output.
11. Match the Lighting of Live Footage to the CGObject.

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Softwares :** Adobe Master Collection, Autodesk Entertainment Suite, V- ray render plugin |

**Text Books:**

* Advanced Maya Texturing and Lighting - Lee Lanier, Publisher: Sybex; 2 edition (August 11, 2008)
* Mental ray for Maya, 3ds Max, and XSI: A 3D Artist's Guide to Rendering - Boaz Livny, Publisher: Sybex (February 20, 2007)

### Books for Reference:

### Real-Time Shadows - Elmar Eisemann, Michael Schwarz, Ulf Assarsson and Michael Wimmer

# Digital Lighting and Rendering - Jeremy Birn

**14BCAVFX505** - **Studio Design & Project Management**

**Course Objectives:**

To provide practical knowledge in setting up production studio, pitching for a project and management of the production

**Module 1** **20 Hours**

Production pipeline – Study of various mediums of production such as Film, T.V, Games, etc

**Module 2** **16 Hours**

Requirement for a Production Pipeline -The process and the pipeline - A typical pipe line – Infrastructure

**Module 3** **24 Hours**

Pipeline Management - Project Management - The work force - The recruitment – Studio Design - India scenario

# Text Books:

# The Visual Effects Producer: Understanding the Art and Business of VFX - Charles Finance, Susan Zwerman, Publisher: Focal Press; 1 edition (August 28, 2009)

* The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures - Jeffrey A. Okun, Publisher: Focal Press; 1 edition (July 8, 2010)

**14BCAVFX506 - Compositing Technique – II**

**Course Objectives:**

The students will receive information that will enable them to:

* Familiarize the tools and techniques to create standard VFX shots
* Learn Problem solving techniques to rectify the errors during compositing.
* Create content for broadcast, feature film and web animation.

**Block I: Compositing Technique**

**Module 1 5 Hours**

Pass Management, Bit Depth Allocation, Finding The Best Depth Channels, Color Channels for the Project

**Module 2 5 Hours**

The LUT use and Specifications, Finding the Black's and White's, Node reusing to Maintain Color Correction, Use of Plugin's in 3D Channels

**Module 3 10 Hours**

Advanced In-Depth Compositing, Concepts and Techniques to Compositing Foliage, Learn to Composite Hair and Fur, Creating and Merging Horizon Lines, Using Vector Blur For Quicker Results

**Module 4 10 Hours**

Creating Macro's and Dummies, 3D Layers / Nodes in Brief, 3D Camera Projection and Tracking, 3D Channels and Depth Creation, RGB Mattes and Rotoscopy Solutions.

**Learning Lab:**

1. Compositing a Cityscape with Live Footage [6hrs]

2. Compositing an Explosion Accident [8hrs]

3. Compositing an Live scene with Multiple CG Characters [8hrs]

4. Compositing a natural Disaster scene [8hrs]

a. Tornado

b. Sunami

c. Earthqwake

d. Ice Berg's Break

e. Valcano

5. Building and Ground Distruction

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Softwares :** Microsoft Windows, Microsoft Office, Adobe Master Collection, Autodesk Entertainment Suite, The Foundry Nuke, Imagineer System Mocha Pro, 2D3 Boujou, RedGiant Plugins, Next Limits Realflow, Afterworks FumeFX, Ray Fire Plugin, V- ray render plugins |

**Text Books:**

* The Art and Science of Digital Compositing, Second Edition: Techniques for Visual Effects, Animation and Motion Graphics - Ron Brinkmann, Publisher : Morgan Kaufmann; 2 edition (June 4, 2008)
* Adobe After Effects CS6 Classroom in a Book - Adobe Creative Team, Publisher : Adobe Press, June 25, 2012

**Books for Reference:**

* Compositing Digital Images, T. Porter and T. Duff, Proceedings of SIGGRAPH '84, 18 (1984)
* The Art and Science of Digital Compositing - Ron Brinkmann
* Wright'sCompositing Visual Effects: Essentials for the Aspiring Artist [Paperback]2007) - Paperback (2007) - S.Wright
* Compositing Visual Effects – Essentials for aspiring artists - Steve Wright

**14BCAVFX601 - Motion Graphics**

**Course Objectives:**

The students will receive information that will enable them to:

* Familiarize the tools and techniques to create Motion graphics and effects
* Learn Problem solving techniques to rectify the errors during the process
* Create content for broadcast, feature film and animation.

**Block I: Introduction to Motion Graphics**

**Module 1 5 Hours**

History of Motion Graphics, early animation techniques, early cinematic inventions, experimental animation, Motion graphics in Film titles and television, Montages

**Module 2** **5 Hours**

Film Titles, Network Branding, Commercials, Music videos, Interactive Media, Digital signage, New Technology

**Module 3** **5 Hours**

Tools and Techniques, Effects, Expressions, Importing external animations, blending 2D, 3D elements

**Module 4** **6 Hours**

Particle effects, light effect, flares, typography animation

**Block II: Motion Theory**

**Module 1** **6 Hours**

The language of motion, spatial and temporal motion, coordinating movement

**Module 2** **6 Hours**

Visual properties, Image considerations, Live action considerations, Typography animation, blending all three mediums, pictorial composition, sequential composition

**Module 3** **6 Hours**

Animation process, Keyframe animation, expressions, animating using sound and scripting

**Module 4** **6 Hours**

Editing, Cuts and transitions, Establishing pace and rhythm, Birth Life and death, conclusion

**Learning Lab:**

1. Create an animated advertisement for any cosmetic product.
2. Create and animate title / end credits for any film/documentary.
3. Create contemporary motion graphics involving live/CG elements
4. Create broadcast logo animations for a TV channel.

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Master Collection, Autodesk Entertainment Suite, The Foundry Nuke, Imagineer System Mocha Pro, 2D3 Boujou, RedGiant Plugins, Next Limits Realflow, Afterworks FumeFX, Ray Fire Plugin, V- ray render plugin |

# Text Books:

# Creating Motion Graphics with After Effects: Essential and Advanced Techniques, 5th Edition, Version CS5 - Chris Meyer, Publisher: focal Press, June 18, 2010

* Nuke 101: Professional Compositing and Visual Effects - Ron Ganba, Publisher: Peachpit Press; 1 edition (April 23, 2011)

**Books for Reference:**

# The Art and Science of Digital Compositing, Second Edition:

# Techniques for Visual Effects, Animation and Motion Graphics (The Morgan Kaufmann Series in Computer Graphics) - Ron Brinkmann (Author)

**14BCAVFX602 - 3D Dynamics – II**

**Course Objectives:**

The student will be trained in the following.

* Understand and formulate the dynamic simulations to be created.
* To create simple dynamic simulations of object collisions and destructions.
* To create particle simulations for simulating liquids and gas.
* To understand and implement scripting for creating dynamic simulations.

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**Block I: Visual Effect in Maya**

**Module 1 8 Hours**

Texture Effects, Streaking energy effects, Particle effects and collisions, Collision events, connecting camera with particles.

**Module 2 16 Hours**

Creating Hiar/Fur simulation, Cloth Simulation, Rigging for effects, Automating Rigs, Paint effects, Controlling paint effects

**Module 3 15 Hours**

Destruction of objects experiments, nature elements simulation using particles [Water, smoke, fire etc]

**Module 4 6 Hours**

Rendering simulations, Optimizing simulations, Simulation for Video and motion graphics

**Learning Lab:**

1. Create dynamic simulations of moving nature elements [Fire, smoke etc]
2. Create dynamic foliages and elements for nature scene[ Grass, Trees, Water Streams etc]

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| **Teaching Pedagogy:** Lecture Demonstration |
| **Software:** Adobe Master Collection, Autodesk Entertainment Suite |

# Text Books:

* Maya Studio Projects: Dynamics - Todd Palamar, Publisher : Sybex, November 2, 2009

# The Art of 3D Computer Animation and Effects - Isaac Kerlow , Publisher : Wiley, April 13, 2009

**Books for Reference:**

* + Maya Studio Projects: Dynamics - Todd Palamar

### Modeling the Environment: Techniques and Tools for the 3D Illustration of Dynamic Landscapes - Bradley Cantrell and Natalie Yates (Mar 27, 2012)

**14BCAVFX603 - Final Project and Internship**

**Course Objectives:**  To Make a Visual FX short film

Duration of Short Film – 60 sec to 90 sec.

Objective in Brief: This Module is to make a visual FX short film by the students as Team or by an Individual. The content will be executed by their creative ability and process providing with the prior storyboard approvals in the earlier semester. Students can come up with a brand new ideas with respect to more scope for VFX that should include elements like FX-Dynamics, Live footage Tracking, Cleaning, including CG elements with the cleaned plates and compositing which eventually will be the industry practice output.

The Core practice of this Module will have unique ideas said that the content should not be re-created or it should not be the inspiration of any works which is published earlier in this medium. Provided sufficient amount of days to complete this Module as an output of VFX movie, students are asked to deliver the movie with enormous creative idea and new industry technology.

The Movie should be having a BREAKDOWN of every individual shots which is generated by the student. Breakdown will have all the different ideas which is used in the students movie using layer style.

**Execution:**

Step 1: Think and Ink

Idea has to build and to mould for VFX movie. The idea can be wage or gag not necessarily a concept but new and the idea should include all the key skills that you learnt in the earlier semesters. The Idea should be visual treat rather than a story or script treat since it’s a VFX movie. The created idea will be approved by the concerned Instructor according to the Achievable complexity with the provided resources.

Step 2: Idea to Script

Put your ideas into papers as script and create a story board for the same. The Story board should have a brief scene description which says the details about the Location, Camera and Lens, Cast and Crew, Light setup and digitization. So this is the place where you need to create the live and CG elements placement and the back and forth process of inserting and removing CG elements which will out the sufficient amount of details which will enhance the reality of visual treat.

The background score is added in the story board to give the final look of the movie. Make sure the story reveals the actual strength in the storyboarding part as a whole. Every aspect of sound should be there in the storyboard...for ex, The water flow, wind flow, object falling down, fight scene. Etc,…

Step 3: StoryBoard to Previz

Used the cleaned plates for Rotoart and use the same footage for overall CG elements Previz to ensure that we follow the same time or more accurate time for the final output. Use dummies(low poly models) as models for the Previz which will replace the actual detailed(high poly models) CG elements. Though you should maintain the texture treatment just to freeze the look and feel of the shot.

Step 4 : Shooting on Location

Be on the spot to make the shot details work close to the CG plan that you planned in storyboard. Take the Camera angle measurements as well as the lens and camera color profile. If you are the director for the movie discuss with yourself that the time and schedule for the camera is more suitable to shoot and a visual mockup of such shots in the location itself will reduce your work.

Step 5: Production and Footage Processing

The Production processes are very parallel to footage matchup, so clean the plates and start comparing and placing the CG elements in the live footage and start rolling the production schedules.

Step 6: Compositing

This is the very important stage in VFX movie. By Playing a very Vitol role decides the look and feel of the your short film. Which involves many references like Color script , look and feel references and photography references to enhance the details in the film. This render output should match with the step 3 storyboard output which will bind the sound to the film.

Step 7: Final Cut

This is the editing stage. Remove unwanted shots and trim cut the shots for the better and more interesting results will make the audience more committed to the Film.

**VIVA:**

**Objectives:**

To impart skills of relating with practical work and theories. To impart skills in articulating the practical production experience using technical language. To understand and communicate the team work of the project. To learn skills in relating the interdisciplinary subjects, electives learnt during this Course.

**Project Report**

**Objective:**

* To impart knowledge in recording and documenting the preproduction, Production and Post production of the Project
* To impart skills in the presentation of the concept of the project, Lay out for the visuals and various stages of the project in professional manner

**Project Report**

Cover page

Neatly designed, coloured, Lay out with suitable font design and size on Art paper

Page 1: Title of the Project and study centre details

Page 2: Contents / index

Page 3: Certificate

Page 4: Guide declaration

Page 5: Candidate declaration

Page 6: The team:

Every group member shall add or pitch his / her role in a separate section within the project report. Number of sheets is flexible need not to be fixed to a single sheet. Paper should be Bond only, not thick Art Paper. Fonts design and size should be good and readable, Preferably 12 for normal text and 14 Bold for Heading*.*

Page XX: pre-production: Synopsis of the Story - script- Story Map

Character designs: Character Bible - Character History - Character Traits - Character flaws - Psychological profile

Page XX: Concept pre visualization: B/W & Coloured sketches of the story environment and other elements

Page XX: Story Board – Complete story board of the script

Story Map is must, Designs should be both concept sketches & coloured ones. For each character use separate page.

Page XX:  production: Blue Book

Production stills of Live Shooting for CG shot

BG sets and props

Dynamic simulation snaps Shots

Texturing & Lighting Snap shots

Page XX:  post- production

Compositing – Shot Breakdown

Editing

Last Page: About Team & Photographs with mentor

Every group should submit properly designed (A4 Size) and well bound project report in three copies. No provision for the Photocopies.