

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Cyber Law and Intellectual Property	Course Code: D022811(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 3 T: 1 P: 0 Credits: 4
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

1. To make attentive to students about different cybercrimes
2. To understand key terms and concepts in cybercrimes and cyber law
3. To make attentive to students about security privacy and challenges
4. To make attentive to students about copyright and Patents

UNIT-I: Introduction to cybercrimes

Definition, cybercrime and information security, classes of cybercrime and categories, cyber offences, cybercrimes with mobile and wireless devices, cybercrime against women and children, financial frauds, social engineering attacks.

UNIT-II: Cybercrime and Cyber law

Malware and ransom ware attacks, zero day and zero click attacks, Legal perspective of cybercrime, IT Act 2000 and its amendments, Cybercrime and offences, Organizations dealing with Cybercrime and Cyber security in India, Case studies

UNIT-III: Social Media Overview and Security

Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hash tag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.

UNIT-IV: Introduction to Intellectual Property Rights (IPR)

Introduction to IPR, International Instruments and IPR, WIPO – TRIPS – WTO -Laws Relating to IPR , IPR Tool Kit : Protection and Regulation, Copyrights and Neighboring Rights, Agencies for IPR Registration, Emerging Areas of IPR, Use and Misuse of Intellectual Property Rights.

UNIT-V: Patents

Introduction to Patents, Laws Relating to Patents in India, Patent Requirements, Product Patent and Process Patent, Patent Search, Patent Registration and Granting of Patent, Exclusive Rights and Limitations, Ownership and Transfer, Revocation of Patent, Patent Appellate Board, Infringement of Patent, Compulsory Licensing, Patent Cooperation Treaty, New developments in Patents, Software Protection and Computer related Innovations.

Text Books:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
2. Cyber Laws: Intellectual property & E Commerce Security, Kumar K. Dominant Publisher
3. Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.

Reference Books:

1. Cyber Law Text & Cases, Gerald R.Ferrera, Margo E.K. Reder, CENGAGELEARNING Publication.
2. Intellectual Property (Trade Marks and the Emerging concepts of Cyber property rights (HB)", P. Narayanan, 3rd Edition. (HB), 2002, Universal Book Traders.

Course Outcomes [After undergoing the course, students will be able to:]

1. Understand the cyber security threat landscape.
2. Understand Cyber crimes and cyber laws.
3. Understand various privacy and security concerns on online Social media its legal aspects and best practices.
4. Understand the importance and applications of IPR its regulations.
5. Understand the application process of patent file and other related aspects such as search, registration and grant.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Computer Vision Laboratory	Course Code: D022821(022)
Total / Minimum-Pass Marks (End Semester Exam): 40 / 20	L: 0 T: 0 P: 2 Credits: 1

Course Objectives:

1. To be able to use Python for Image handling and processing.
2. To perform Geometric transformations and computer homography matrix in Python.
3. To be able to perform perspective transformation, edge detection, line detection and corner detection.
4. To be able to implement SIFT, SURF and HOG in Python.

Write programs to perform following activities:

1. Perform basic Image Handling and Processing operations on the image.
2. Geometric Transformation
3. Compute Homography Matrix
4. Perspective Transformation
5. Camera Calibration
6. Compute Fundamental Matrix
7. Edge Detection, Line Detection and Corner Detection
8. SIFT Feature descriptor
9. SURF and HOG feature descriptor
10. Project based on Computer Vision Applications.

Recommended Books:

1. Programming Computer Vision with Python, Jan Erik Solem, O'Reilly Media, ISBN: 9781449316549.
2. Practical Machine Learning for Computer Vision: End-to-End Machine Learning for Images, Valliappa Lakshmanan, O'Reilly Media, ISBN: 9391043836.

Course Outcomes [After undergoing the course, students will be able to:]

1. Apply Python for Image handling and processing.
2. Apply Python for Geometric transformations and computer homography matrix.
3. Apply Python for perspective transformation, edge detection, line detection and corner detection.
4. Apply Python for SIFT, SURF and HOG.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII)	Branch: Computer Science & Engineering
Subject: R Programming Laboratory	Course Code: D022822(022)
Total / Minimum-Pass Marks (End Semester Exam): 40 / 20	L: 0 T: 0 P: 2 Credits: 1

Course Objectives:

1. Demonstrate use of basic functions
 2. Create their own customized functions
 3. Construct tables and figures for descriptive statistics
 4. Learn to understand new data sets and functions by yourself
 5. Work on built in real time cases for analysis and visualization
 6. Enable to build programming logic and thereby developing skills in Programming.
 7. Clear understanding on how to organize data and analyze data using real time examples.
- LEARNING OUTCOMES:**
1. Write a program to check whether a year (integer) entered by the user is a leap year or not?
 2. Write an R program to find the sum of natural numbers without formula using the if-else statement and the whileloop.
 3. Write a program that prints the grades of the students according to the marks obtained. The grading of the marks should be as follows. Marks Grades 800-1000 A+ 700 – 800 A 500 – 700 B+ 400-500 B 150 – 400 C Less than 150 D
 4. Write an R program to make a simple calculator that can add, subtract, multiply and divide using switch cases and functions.
 5. Write a program to perform searching within a list (1 to 50). If the number is found in the list, print that the search is successful otherwise print that the number is not in the list.
 6. Create a list and data frame that stores the marks of any three subjects for 10 students. Find out the total marks, average, maximum marks and minimum marks of every subject.
 7. Write the steps to import data from Excel to CSV files and apply data viewer functions like rm(), dim(), head(), tail(), sorting, filtering, searching to view few set of rows.
 8. Write a program to create two 3 X 3 matrices A and B and perform the following operations a) Transpose of the matrix b) addition c) subtraction.
 9. Write an R program to create a list containing strings, numbers, vectors and logical values and do the following manipulations over the list.
 - a. Access the first element in the list
 - b. Give the names to the elements in the list
 - c. Add element at some position in the list
 - d. Remove the element
 - e. Print the fourth element
 - f. Update the third element
 10. Let us use the built-in dataset air quality which has Daily air quality measurements in New York, May to September 1973. Create a histogram by using appropriate arguments for the following statements.
 - a. Assigning names, using the air quality data set.
 - b. Change colors of the Histogram
 - c. Remove Axis and Add labels to Histogram
 - d. Change Axis limits of a Histogram
 - e. Create a Histogram with density and Add Density curve to the histogram
 11. Design a data frame in R for storing about 20 employee details. Create a CSV file named “input.csv” that defines all the required information about the employee such as id, name, salary, start_date, dept. Import into R and do the following analysis.
 - a. Find the total number rows & columns
 - b. Find the maximum salary
 - c. Retrieve the details of the employee with maximum salary
 - d. Retrieve all the employees working in the IT Department
 - e. Retrieve the employees in the IT Department whose salary is greater than 20000 and write these details into another file “output.csv”.
 12. Create a dataset or table [‘Smart Phone’] in an excel sheet that stores the mobile information [price, company name, model, Sale Percent] of five different companies. Store at least 20 rows. Write the scripts and find out the output for the following information.
 - a. Maximum price of the mobile of each company
 - b. Minimum price of mobile of each company
 - c. Average price of mobile of each company
 - d. Total Price of mobile of each company

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Major Project (Phase-II)	Course Code: D022823(022)
Total/Minimum-Pass Marks (End Semester Exam): 350/175	L: 0 T: 0 P: 14 Credits: 7

Guideline for Allocation of project:

1. Information regarding broad area must be made available to the students well in advance (may be during previous semester).
2. Information must cover following parameters.
 - I. Broad area: Subject or expertise/application area.
 - II. Required skills: Knowledge of subject(s), software, tools & other characteristics.
 - III. Type of project: Hardware, software, design, survey, study based etc.
 - IV. Guide available: Name of Guide (S) from Department & Institute.
 - V. Other related information depending upon specific branch & institute.
3. It is also recommended to give proper counseling to pick up suitable project.
4. Students must get chance to select projects as per their choice or decided mutually between students and department faculty (HoD) concern.
5. One project group must contain maximum four students, however students can do project individually but it should be approved by department.
6. Compiled list of projects must be submitted to the University within 25 days of start of semester.
7. Compiled list may contain following parameters.

Monitoring of project:

1. It is recommended to give projects as per the specializations of existing faculty of the department instead of outside person/agency.
2. Project must be allocated, developed and monitored by department / institution itself, but not by outside agencies.
3. Regular review by guide is recommended to ensure development & contribution of students.

Internal Evaluation & Submission of project:

1. Evaluation of project would be as per the examination scheme of the University, which is based on internal as well as external evaluation.
2. Internal assessment requires submission of project report for getting approved by the concern authority. However printing and binding would be as per the conventional format.
3. Evaluation will be based on live demonstration / presentation and Viva.
4. Final submission of project is expected as,
 - Submission of a copy to the University,
 - One copy to the Institution central library,
 - One copy to the department.

External Evaluation:

External assessment of project would be like conduction of practical exams of University, and must be executed as per the norms of practical exams.

NOTE: Completion of Project outside the department/Institution should not be encouraged.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Introduction to Game Theory	Course Code: D022831(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

The objective of this course is to understand the various architecture of game Theory and Game engine design, their support system and human interface.

UNIT-I: Introduction: Modeling the real world, Evolutionary Game Theory, Linear and Non Linear Dynamical Systems, 2- Player & 2-Strategy (2 x 2) Games , Dynamics Analysis of the 2 x 2 Game , Multi-player Games ,Structure of a Typical Game Team , What Is a Game? , What Is a Game Engine? , Engine Differences Across Genres , Game Engine Survey , Runtime Engine Architecture , Tools and the Asset Pipeline, Tools of the Trade : Version Control , Microsoft Visual Studio , Profiling Tools , Contents. [8 hrs]

UNIT-II: Fundamentals of Software Engineering for Games , C++ Review and Best Practices , Data, Code, and Memory in C/C++ , Catching and Handling Errors , 3D Math for Games , Solving 3D Problems in 2D ,Points and Vectors , Matrices , Quaternions , Comparison of Rotational Representations.[7 hrs]

UNIT-III: Low-Level Engine Systems , Engine Support Systems , Subsystem Start-Up and Shut-Down , Memory Management, Containers , Strings , Engine Configuration ,Resources and the File System , File System ,The Resource Manager, The Game Loop and Real-Time Simulation , The Rendering Loop , The Game Loop , Game Loop Architectural Styles.[7 hrs]

UNIT-IV: Human Interface Devices, Types of Human Interface Devices, Interfacing with a HID , Types of Inputs , Types of Outputs , Game Engine HID Systems, Tools for Debugging and Development , Logging and Tracing , Debug Drawing Facilities, In-Game Menus & Console , Debug Cameras and Pausing the Game , Cheats, Screenshots and Movie Capture ,In-Game Profiling. [7 hrs]

UNIT-V: The Rendering Engine, Animation system : types , poses skeleton, clips, post processing, Action state machine, Rigid body dynamics, Mathematics of Sound and Audio engine architectures, Data driven game engine.[7 hrs]

Reference Books:

1. Jun Tanimoto, Fundamentals of evolutionary game theory and its applications Fundamentals of evolutionary game theory and its applications, Vol-6, Springer
2. Jason Gregory, The Game Engine Architecture, 3rd edition CRC press, Tylor & Francis group.
3. David H. Eberly, 3D Game Engine Architecture Engineering Real-Time Applications with Wild Magic, Magic Software, Inc.

Course Outcomes [After undergoing the course, students will be able to:]

1. To Structure of Game Theory and Game engine and various tools
2. Understand fundamentals of software engineering form games and and 3D maths for game
3. To understand Engine system and game loop and real time simulation
4. To study Human interface device, Cameras and pausing of games.
5. To provide a knowledge rendering engine, Action state machine ,rigid body dynamics, Mathematics of Sound and and audio engine architecture.

Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.)

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: R Programming	Course Code: D022832(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

1. Learn Fundamentals of R.
2. Covers how to use different functions in R, how to read data into R, accessing R packages, writing R functions, debugging, and organizing data using R functions.
3. Cover the Basics of statistical data analysis with examples.
4. The whole syllabus will give an idea to collect, compile and visualize data using statistical functions.

UNIT-I: Introduction to R: What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed. packages(), package Description(), help(), find. package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and –inf.

UNIT-II: R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R - Variables: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables - R Operators: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - R Decision Making: if statement, if – else statement, if – else if statement, switch statement – R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement.

UNIT-III: R-Function : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting –

UNIT-IV: R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels gl().

UNIT-V: Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, ExpandData Frame: Add Column, Add Row - Joining columns and rows in a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Casting data melt(), cast(). Loading and handling Data in R: Getting and Setting the Working Directory – getwd(), setwd(), dir() - R-CSV Files - Input as a CSV file, Reading a CSV File, Analyzing the CSV File: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File – R -Excel File – Reading the Excel file.

Reference Books:

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN : 978-93-5260-455-5.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.
3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), R Programming, Retrieved from https://www.tutorialspoint.com/r/r_tutorial.pdf.
4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015, ISBN: 978-1-119-05580-8

Course Outcomes [After undergoing the course, students will be able to:]

1. Understand the basics of Fundamentals of R.
2. Understands the loading, retrieval techniques of data.
3. Understand how data is analysed and visualized using statistic functions.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Multimedia & Computer Vision	Course Code: D022833(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objective:

1. To understand the fundamental issues and problems in the representation, manipulation, and delivery of multimedia content particularly in a networked environment.
2. To understand the concepts of multimedia components.
3. To understand the basic concepts of Computer vision.

UNIT-I: Introduction

Concept of Multimedia, media & data stream, Main properties of multimedia system, Data stream characteristics of continuous media, multimedia Applications, Hardware and software requirements, Multimedia Products & its evolution.

UNIT-II: Components Of Multimedia

Text, Basic sound concepts, MIDI, Speech, Basic concept of Images, Graphics format, Overview of image processing, Basic concepts of Video & animation, Conventional system, Transmission, Enhanced system, High-Definition system, Computer based animation, Design & authoring Tools, Categories of Authority Tools, Types of products

UNIT-III: Data Compression

Coding requirement, Source, entropy, hybrid coding, JPEG, MPEG, Text compression using static Huffman technique, Dynamic Huffman Technique, Statistical coding techniques.

UNIT-IV: Optical Storage Media

Videodisk and other WORMS, Compact Disk digital audio, Advantage of CD-DA Frames tracks blocks of CD-DA, CD-ROM, and Further CD-ROM based developments, Principles of CDWO, Prospects of CD technologies.

UNIT-V: Introduction To Computer Vision

Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis, feature detection, image classification.

Text Books:

1. Multimedia System Design, Andleigh and Thakarar , PHI, 2003.
2. Multimedia Technology & Application, David Hillman, Galgotia Publications.
3. Computer Vision: A modern approach, Forsyth & Ponce, 2nd Ed., Pearson 2011

Reference Books:

1. Multimedia Computing Communication and Application, Steinmetz, Pearson Edn.
2. Fundamentals of Computer Graphics and Multimedia, D.P. Mukherjee, PHI

Course Outcomes [After completion of this course the students will be able to:]

1. To Know the fundamental video, audio, image, text processing techniques
2. Acquire the basic skill of designing video compression, audio compression, image compression, text compression.
3. To Know the basic techniques in designing video transmission systems: error control and rate control
4. To Identify basic concepts, terminology, theories, models and methods in the field of computer vision.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Program / Semester: B.Tech (VIII Sem)	Branch: Computer Science & Engineering
Subject: Augmented & Virtual Reality	Course Code: D022833(022)
Total / Minimum-Pass Marks (End Semester Exam): 100 / 35	L: 2 T: 1 P: 0 Credits: 3
Class Tests & Assignments to be conducted: 2 each	Duration (End Semester Exam): 03 Hours

Course Objectives:

The objective of this course is to provide a foundation to the fast growing field of AR and make the students aware of the various AR devices.

UNIT-I: Introduction to Augmented Reality: Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality. Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.

UNIT-II: Augmented Reality Hardware: Augmented Reality Hardware – Displays – Audio Displays, Haptic Displays, Visual Displays, Other sensory displays, Visual Perception , Requirements and Characteristics, Spatial Display Model. Processors – Role of Processors, Processor System Architecture, Processor Specifications. Tracking & Sensors - Tracking, Calibration, and Registration, Characteristics of Tracking Technology, Stationary Tracking Systems, Mobile Sensors, Optical Tracking, Sensor Fusion.

UNIT-III: Computer Vision for Augmented Reality & A.R. Software: Computer Vision for Augmented Reality - Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection, Simultaneous Localization and Mapping, Outdoor Tracking Augmented Reality Software - Introduction, Major Software Components for Augmented Reality Systems, Software used to Create Content for the Augmented Reality Application.

UNIT-IV: AR Techniques- Marker based & Markerless tracking: Marker-based approach- Introduction to marker-based tracking, types of markers, marker camera pose and identification, visual tracking, mathematical representation of matrix multiplication Marker types- Template markers, 2D barcode markers, imperceptible markers. Marker-less approach- Localization based augmentation, real world examples Tracking methods- Visual tracking, feature based tracking, hybrid tracking, and initialisation and recovery.

UNIT-V: AR Devices & Components: AR Components – Scene Generator, Tracking system, monitoring system, display, Game scene AR Devices – Optical See- Through HMD, Virtual retinal systems, Monitor bases systems, Projection displays, Video see-through systems. Introduction to mixed reality, Applications of mixed reality, Input and Output in Mixed reality, Computer Vision and Mixed Reality, simultaneous localization and mapping (SLAM).

Text Books:

1. Allan Fowler-AR Game Development, 1st Edition, A press Publications, 2018, ISBN 978-1484236178
2. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India; First edition (12 October 2016),ISBN-10: 9332578494

Reference Books:

1. Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN: 9781491962381.
2. Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0.

Course Outcomes [After undergoing the course, students will be able to:]

1. Describe how AR systems work and list the applications of AR.
2. Understand and analyse the hardware requirement of AR.
3. Use computer vision concepts for AR and describe AR techniques.
4. Analyse and understand the working of various state of the art AR devices.
5. Acquire knowledge of mixed reality.