SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester: VI**	
Course: Wireless Sensor Networks and Mobile Communication		**Course Code: USMACS601**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment**	**Semester End Examinations (SEE)**
04	4	25%	75%

Learning Objectives:

- In this era of wireless and adhoc network, connecting different wireless devices and understanding their compatibility is very important. Information is gathered in many different ways from these devices. Learner should be able to conceptualize and understand the framework. On completion, will be able to have a firm grip over this very important segment of wireless network.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Develop various applications of wireless sensor networks

CO2: Explore the concepts, protocols, design, implementation and use of wireless sensor networks.

CO3: Model working of mobile telecommunications system

Outline of Syllabus: (per session plan)

Module	**Description**	**No of hours**
1	Fundamentals of WSN	15
2	Advanced issues in WSN	15
3	MAC in WSN	15
4	Mobile telecommunications	15
	Total	**60**

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Module	Wireless Sensor Networks and Mobile Communication	No. of Hours/Credits 60/4
1	**Fundamentals of WSN**	**15**
	Introduction: Introduction to Sensor Networks, unique constraints and challenges. Advantage of Sensor Networks, Applications of Sensor Networks, Mobile Adhoc NETworks (MANETs) and Wireless Sensor Networks, Wireless fieldbuses and WSNs, Enabling technologies for Wireless Sensor Networks. Sensor Node Hardware and Network Architecture: Single-node architecture, Hardware components & design constraints, Runtime environments for sensor nodes, Operating systems and execution environments, introduction to TinyOS and nesC. Network architecture, Optimization goals and figures of merit Design principles for WSNs, Service interfaces of WSNs, Gateway concepts. Channel models, Transceiver design	5 6 4
2	**Advanced issues in WSN**	**15**
	Naming & Addressing: Fundamentals, Address and name management in wireless sensor networks, Assignment of MAC addresses, Distributed assignment of locally unique addresses, Content-based and geographic addressing Time synchronization: Introduction, Protocols based on sender/receiver synchronization - LTS, Protocols based on receiver/receiver synchronization – RBS Localization and positioning: Properties of localization and positioning procedures, Possible approaches, Single-hop localization, Positioning in multihop environments	5 5 5
3	**MAC in WSN**	**15**
	Medium Access Control Protocols: Principal options and difficulties, Fundamentals of MAC Protocols, MAC Protocols for WSNs, Sensor-MAC, Dynamic S-MAC, Mobility-aware MAC, D-MAC, Timeout-MAC Case Study	6

	Routing Protocols : Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless Sensor Networks, Routing Strategies in Wireless Sensor Networks. Transport Control Protocols : Traditional Transport Control Protocols, Transport Protocol Design Issues, Examples of Existing Transport Control Protocols, Performance of Transport Control Protocols	5 4
4	**Mobile telecommunications**	**15**
	Introduction, Wireless Transmission and Medium Access Control: Applications, A short history of wireless communication. Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems. Telecommunication, Satellite and Broadcast Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, security, New data services; DECT: System architecture, Protocol architecture; ETRA, UMTS and IMT- 2000. Satellite Systems: History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover Broadcast Systems: DAB: Architecture, DVB	4 8 3

RECOMMENDED READING

ESSENTIAL READING:

1. Protocols and Architectures for Wireless Sensor Network, Holger Kerl, Andreas Willig, John Wiley and Sons, 2005
2. Wireless Sensor Networks Technology, Protocols, and Applications, Kazem Sohraby, Daniel Minoli and TaiebZnati, John Wiley & Sons, 2007
3. Mobile communications, Jochen Schiller,2nd Edition, Addison wisely, Pearson Education,2012

SUPPLEMENTARY READING:

4. Fundamentals of Wireless Sensor Networks, Theory and Practice, Waltenegus Dargie, Christian Poellabauer , Wiley Series on wireless Communication and Mobile Computing, 2011
5. Networking Wireless Sensors, Bhaskar Krishnamachari , Cambridge University Press, 2005

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester: VI**	
Course: Ethical Hacking & Cyber forensics		**Course Code:- USMACS605**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment**	**Semester End Examinations (SEE)**
04	4	25%	75%

Learning Objectives:

- To advance conceptual cognizance of ethics, legality, methodologies and techniques of hacking and the procedures for identification, preservation, extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered.

Course Outcomes:

After completion of the course, learners will be able to:

CO1: Identify security vulnerabilities and weaknesses in the target applications.
CO2: Analyse security systems using various tools
CO3: Investigate forensics in different networks
CO4: Evaluate various media to collect evidence, report them in a way that would be acceptable in the court of law.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of hours**
1	Information Security: Attacks, Vulnerabilities and their prevention mechanisms	15
2	Ethical Hacking – I (Introduction and pre-attack).	15
3	Computer, Network, Cell Phone & Internet Forensics.	15
4	E-mail Forensics, social media forensics & Investigations	15
	Total	**60**

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Module	Ethical Hacking & Cyber forensics	No. of Hours/Credits 60/4
1	**Information Security: Attacks, Vulnerabilities and their prevention mechanisms**	**15**
	Information Security: Attacks and Vulnerabilities Asset, Access Control, CIA, Authentication, Authorization, Risk, Threat, Vulnerability, Attack, Malware, Worms, viruses, Trojans, Spyware, Rootkits, Types of vulnerabilities: Top 10 OWASP. Types of attacks and their common prevention mechanisms: Keystroke Logging, Denial of Service (DoS /DDoS), Waterhole attack, brute force, phishing and fake WAP, Eavesdropping, Man-in-the-middle, Session Hijacking, Clickjacking, Cookie Theft, URL Obfuscation, buffer overflow, DNS poisoning, ARP poisoning, Identity Theft, IoT Attacks, BOTs and BOTNETs Case-studies: Recent attacks – Yahoo, Adult Friend Finder, eBay, Equifax, WannaCry, Target Stores, Uber, JP Morgan Chase, Bad Rabbit, Media Markt, Kaseya, JBS, Colonial Pipeline, The University of California at San Francisco.	5 5 5
2	**Ethical Hacking**	**15**
	Introduction: Ethical Hacking Terminology, Types of Hacking Technologies, Phases Black Hat vs. Gray Hat vs. White Hat (Ethical) hacking, why is Ethical hacking needed? How is Ethical hacking different from security auditing and digital forensics? Vulnerability assessment and Penetration Testing, Application Security Testing, Phases, Foot printing and Social Engineering, Sniffers, systems hacking – Windows and Linux – Metasploit Kali Linux, Keylogging, Buffer Overflows, Privilege Escalation, Network hacking - ARP Poisoning, Password Cracking, WEP Vulnerabilities, MAC Spoofing, MAC Flooding, IP Spoofing, SYN Flooding, Smurf attack. Recent Case studies.	5 5 5
3	**Computer, Network, Cell Phone & Internet Forensic Forensics**	**15**

	Computer Forensics: Introduction to Digital Forensics and its phases, Preparing for Digital Investigations, Data Acquisition and Processing Crime Incident Scenes, Understanding File Systems and recovery, Data Encryption and Compression, Automated Search Techniques, Forensics Software Network Forensic: Introduction to Network Forensics and tracking network traffic, Reviewing Network Logs, Network Forensics Tools, Performing Live Acquisitions, Order of Volatility, and Standard Procedure. Cell Phone and Mobile Device Forensics: Overview, Acquisition Procedures for Cell Phones and Mobile Devices Internet Forensic: Introduction to Internet Forensics, World Wide Web Threats, Obscene and Incident transmission, Domain Name Ownership Investigation, Reconstructing past internet activities and events	5 5 5
4	**E-mail Forensics, social media forensics & Investigations**	**15**
	E-mail Forensics: e-mail analysis, e-mail headers and spoofing, Laws against e-mail Crime, Messenger Forensics: Yahoo Messenger Social Media Forensics: Social Media Investigations Browser Forensics: Cookie Storage and Analysis, Analyzing Cache and temporary internet files, Web browsing activity reconstruction Investigation, Evidence presentation and Legal aspects of Digital Forensics: Authorization to collect the evidence, Acquisition of Evidence, Authentication of the evidence, Analysis of the evidence, Reporting on the findings, Testimony, Report Writing for High-Tech Investigations Introduction to Legal aspects of Digital Forensics: Laws & regulations, Information Technology Act, Giving Evidence in court, Case Study – Cyber Crime cases, Case Study – Cyber Crime cases.	5 5 5

ESSENTIAL READING:

1) CEH official Certified Ethical Hacking Review Guide, Wiley India Edition, Kimberly Graves
2) Guide to computer forensics and investigations, Bill Nelson, Amelia Philips and Christopher Steuart, course technology,5th Edition,2015 Additional
3) https://www.owasp.org/index.php/Category:OWASP_Top_Ten_2017_Project 5)

4) https://www.owasp.org/index.php/Mobile_Top_10_2016-Top_10 6)
5) https://www.owasp.org/index.php/OWASP_Testing_Guide_v4_Table_of_Contents 7)
6) https://www.owasp.org/index.php/OWASP_Secure_Coding_Practices_-_Quick_Reference_
7) Guide 8) https://cve.mitre.org/ 9) https://access.redhat.com/blogs/766093/posts/2914051 10)
8) http://resources.infosecinstitute.com/applications-threat-modeling/#gref 11)
9) http://www.vulnerabilityassessment.co.uk/Penetration%20Test.html

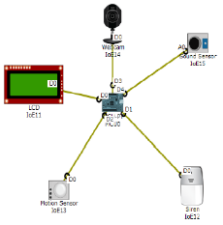
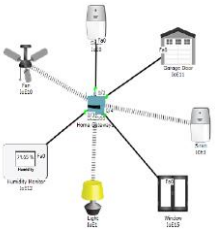
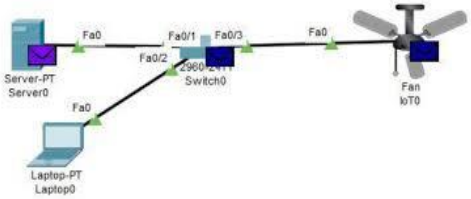
SUPPLEMENTARY READING:

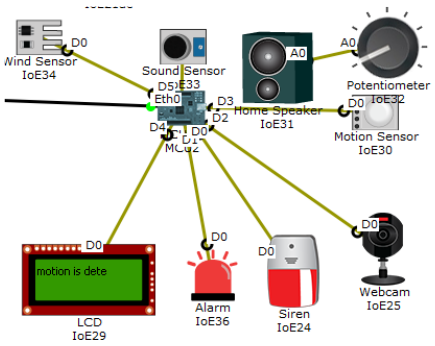
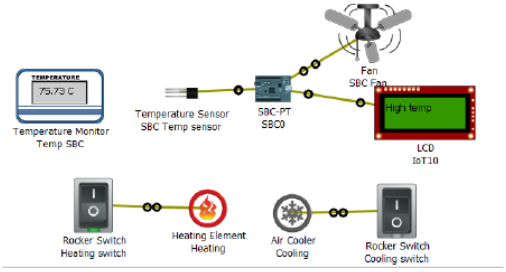
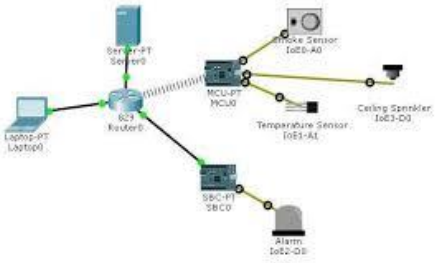
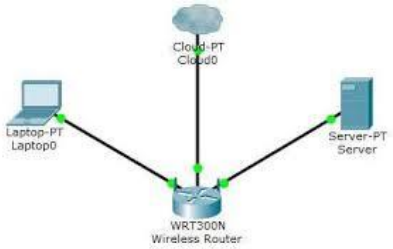
1) Incident Response and computer forensics, Kevin Mandia, Chris Prosise, Tata McGrawHill,2nd Edition,2003
2) Certified Ethical Hacker: Michael Gregg, Pearson Education,1st Edition, 2013

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)			**Semester: VI**
Course: Computer Science Practical 13 (Based on Wireless Sensor Networks and Mobile Communication and Ethical Hacking and Cyber Forensics)			**Course Code: USMACSP612**
Teaching Scheme		**Evaluation Scheme**	
Practical (Hours per week)	**Credit**	**Continuous Assessment (CA)**	**Semester End Examinations (SEE)**
6	3	20%	80%

List of Practical Wireless Sensor Networks and Mobile Communication

Sr. No	**Topic.**
1	Create and simulate a simple adhoc network.
2	Create the following network & simulate its working: 
3	Create the following network & simulate its working: 
4	Create the following network & simulate its working: 
5	Create the following network & simulate its working:

	
6	Create the following network & simulate its working: 
7	Create the following network & simulate its working: 
8	Create the following network & simulate its working: 
9	Implement the working of LEACH algorithm
10	Implement the working of SPIN algorithm
List of Practical Ethical Hacking and Cyber Forensics	

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Sr. No.	Topic.
1	Port Scanning using NMap, Superscan
2	Use Wireshark (Sniffer) to capture network traffic and analyze.
3	Simulate persistent cross-site scripting attack.
4	Session impersonation using Firefox and Tamper Data add-on.
5	Perform SQL injection attack
6	simple keylogger using python
7	Creating a Forensic Image using FTK Imager/Encase Imager : - Creating Forensic Image - Check Integrity of Data - Analyze Forensic Image
8	Using Sysinternals tools for Network Tracking and Process Monitoring : - Check Sysinternals tools - Monitor Live Processes - Capture RAM - Capture TCP/UDP packets - Monitor Hard Disk - Monitor Virtual Memory - Monitor Cache Memory
9	Recovering and Inspecting deleted files - Check for Deleted Files - Recover the Deleted Files - Analyzing and Inspecting the recovered files Perform this using recovery option in ENCASE and also Perform manually through command line.
10	Email forensics using Access Data FTK

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester: VI**	
Course: Information Retrieval		**Course Code: USMACS603**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment**	**Semester End Examinations (SEE)**
04	4	25%	75%

Learning Objectives:

- To provide an overview of the important issues in classical and web information retrieval. Thefocus is to give an up-to- date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents and of methods for evaluating systems.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Define Information retrieval and tabulate its components.
CO2: Identify Boolean retrieval methods and evaluate queries using it.
CO3: Infer term vocabulary and apply normalization.
CO4: Discuss and Demonstrate different index construction and compression methods.
CO5: Explain different recommender system and specialized searches.
CO6: Assess link analysis methods and implement them.
CO7: Appraise and create simple crawlers.

Outline of Syllabus: (per session plan)

Module	**Description**	**No of hours**
1	Introduction to Information Retrieval and Boolean Retrieval	15
2	Index Construction, Compression & Specialized Search	15
3	Vector Space Model, Query Expansion and feedback	15
4	Web Search Engine Crawlers and Link Analysis	15
	Total	**60**

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Module	Information Retrieval	No. of Hours/Credits 60/4
1	**Introduction to Information Retrieval and Boolean Retrieval**	**15**
	Introduction to Information Retrieval: Introduction, History of IR, Components of IR, and Issues related to IR	2
	Boolean retrieval, The term vocabulary and postings lists,	9
	Dictionaries and tolerant retrieval.	4
2	**Index Construction, Compression & Specialized Search**	**15**
	Index Construction & Compression	9
	Personalized search, Collaborative filtering and content-based recommendation of documents and products	3
	handling "invisible" Web, Snippet generation, Summarization, Question Answering, Cross- Lingual Retrieval,	4
	Hadoop & Map Reduce	1
3	**Vector Space Model, Query Expansion and feedback**	**15**
	Vector space model - Parametric and zone indexes, Term frequency and weighting, The vector space model for scoring	6
	Evaluation in information retrieval - Information retrieval system evaluation, Evaluation of unranked retrieval sets, Evaluation of ranked retrieval results	5
	Assessing relevance Relevance feedback and pseudo relevance feedback	4
4	**Web Search Engine Crawlers and Link Analysis**	**15**
	Link Analysis, hubs and authorities, Page Rank and HITS algorithms	5
	Web Search Engine: Web search overview, web structure, the user,paid placement, search engine optimization/spam, Web size measurement, search engine optimization/spam, Web SearchArchitectures	6
	Web crawling and indexes	4

ESSENTIAL READING:

1. Introduction to Information Retrieval, C. Manning, P. Raghavan, and H. Schütze, CambridgeUniversity Press, 2008

2. Modern Information Retrieval: The Concepts and Technology behind Search, Ricardo Baeza -Yates and Berthier Ribeiro – Neto, 2nd Edition, ACM Press Books 2011.

SUPPLEMENTARY READING:

1. Search Engines: Information Retrieval in Practice, Bruce Croft, Donald Metzler and TrevorStrohman, 1st Edition, Pearson, 2009.
2. Information Retrieval Implementing and Evaluating Search Engines, Stefan Büttcher,
3. Charles L. A. Clarke and Gordon V. Cormack, The MIT Press; Reprint edition (February 12, 2016)

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester : VI**	
Course: Data Science		**Course Code: USMACS606**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment**	**Semester End Examinations (SEE)**
04	4	25%	75%

Learning Objectives:

- Demonstrate the application data in real life.
- Apply concepts of statistical techniques with respect to data.
- Develop pseudo code for analyzing data and its parameters.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Analyse the importance and veracity of data

CO2: Prioritize the tools available to visualize data

CO3: Apply supervised learning models on standard data set.

CO4: Develop techniques of removing noise from data

Outline of Syllabus: (per session plan)

Module	**Description**	**No of hours**
1	Introduction to Data Science	15
2	Data Curation	15
3	Data Management and Organization	15
4	Data Visualization	15
	Total	**60**

Module	**Data Science**	**No. of Hours/Credits 60/4**
1	**Introduction to Data Science**	**15**
	What is Data? Different kinds of data, Introduction to high level programming language + Integrated Development Environment (IDE), Exploratory Data Analysis (EDA) + Data Visualization, Different types of data sources, Data Management: Data Collection, Data cleaning/extraction, Data analysis & Modeling	7

	Introduction to high level programming language + Integrated Development	3
	Data sources: e.g. relational databases, web/API, streaming, Data collection: e.g. sampling, design (observational vs experimental) and its impact on visualization, modeling and generalizability of results	5
2	**Data Curation**	**15**
	Data Curation: Query languages and Operations to specify and transform data, Structured/schema based systems as users and acquirers of data Semi-structured systems as users and acquirers of data, Unstructured systems in the acquisition and structuring of data, Security and ethical considerations in relation to authenticating and authorizing access to data on remote systems.	7
	Data analysis/modeling: Question/problem formation along with EDA Introduction to estimation and inference (testing and confidence intervals) including simulation and resampling o Scope of inference Assessment and selection e.g. training and testing sets	8
3	**Data Management and Organization**	**15**
	Large scale data systems Paradigms for distributed data storage o Practical access to example systems , Introduction to NoSQL Amazon Web Services (AWS) provides public data sets in Landsat, genomics, multimedia.	5
	Layered Framework: Definition of Data Science Framework, Cross Industry Standard Process for Data Mining (CRISP-DM), Homogeneous Ontology for Recursive Uniform Schema, The Top Layers of a Layered Framework, Layered Framework for High-Level Data Science and Engineering Business Layer: Business Layer, Engineering a Practical Business Layer Utility Layer: Basic Utility Design, Engineering a Practical Utility Layer	5
	Layer II Three Management Layers: Operational Management Layer, Processing-Stream Definition and Management, Audit, Balance, and Control Layer, Balance, Control, Yoke Solution, Cause-and-Effect, Analysis System, Functional Layer, Data Science Process	5

4	**Introduction to Supervised Algorithms**	**15**
	Introduction to Regression: Linear Regression, Polynomial regression. Metric for regression –mean square error. Introduction to classification : decision tree, threshold for classification , metric for classification-accuracy, F1 score , confusion matrix. Type I and type 2 errors. Bias and variance , overfitting and under fitting in supervised algorithm	5 5 5

ESSENNTIAL READING:

1) "Fundamentals of Data Science: Take the First Step to Become A Data Scientist", Samuel Burns, Amazon KDP Printing and Publishing.
2) "Practical Statistics for Data Science", Peter Bruce, Andrew Bruce, O'Reilly, 2017.
3) "Practical Data Science Cookbook", Prabhanjan Tatter, Tony Ojeda, Sean Patrik Murphy, Benjamin Bengfort, Abhijit Dasgupta, 2nd Edition, Packt, 2014

SUPPLEMENTARY READING:

1) "Probability and Statistics for Engineers", Dr. J. Ravichandran,2010.
2) "Statistics for Data Science", James D. Miller, Packt, 2017

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester: V**	
Course: Computer Science Practical 14 (Based on Information Retrieval and Data Science)		**Course Code: USMACSP634**	
Teaching Scheme		**Evaluation Scheme**	
Practical (Hours per week)	**Credit**	**Continuous Assessment (CA)**	**Semester End Examinations (SEE)**
6	3	20%	80%

List of Practical Information Retrieval

Sr. No.	**Topic.**
1	Write a program to implement incidence matrix and evaluate query.
2	Write a program for Pre-processing of a Text Document: stop word removal.
3	Write program to implement k-grams.
4	Implement Dynamic programming algorithm for computing the edit distance betweenstrings s1 and s2. (Hint. Levenshtein Distance)
5	Implement Porter Stemmer.
6	Write a program to Compute Similarity between two text documents.
7	Write a program to implement Soundex algorithm
8	Write a map-reduce program to count the number of occurrences of each alphabetic character in the given dataset. The count for each letter should be case-insensitive (i.e.,include both upper-case and lower-case versions of the letter; Ignore non-alphabetic characters).
9	Write a program for index compression
10	Implement Page Rank Algorithm.
11	Write a program for mining Twitter to identify tweets for a specific period and identifytrends and named entities.
12	Write a program to implement simple web crawler.

List of Practical Data Science

Sr. No.	**Topic.**
1	Data Collection, Modelling and Compilation.
2	Data Visualization.

3	Data normalization (removal of useless columns, clean data)
4	Exploratory data analysis.
5	Linear regression
6	Multivariate Regression analysis
7	Data transformations and quality analysis.
8	Implement decision tree
9	Data visualization

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester : VI**	
Course: Skill Enhancement: Human Computer Interaction		**Course Code: USMACS607**	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment**	**Semester End Examinations (SEE)**
02	2	25%	75%

Learning Objectives:

- To facilitate communication between students of psychology, design, and computer science on user interface development projects.
- To provide the future user interface designer with concepts and strategies for making design decisions.
- To expose the future user interface designer to tools, techniques, and ideas for interface design.

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Analyze the importance user interactions.

CO2: Compare the tools and techniques of screen design components **CO3:** Analyze the tools and techniques of components

CO3: Apply models in real life

CO4: Develop techniques of designing human computer interactions

Outline of Syllabus: (per session plan)

Module	**Description**	**No of hours**
1	Introduction to HCI	10
2	Screen Designing	10
3	Components and tools	10
	Total	**30**

Module	Skill Enhancement: Human Computer Interaction	No. of Hours/Credits 30/2
1	**Introduction to HCI**	**10**
	Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.	3
	The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.	3
	Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business junctions.	4
2	**Screen Designing**	**10**
	Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design	6
	Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.	4
3	**Components and tools**	**10**
	Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors. Software tools – Specification methods, interface – Building Tools.	5
	Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers	5

ESSENTIAL READING:

1) The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2) Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

SUPPLEMENTARY READING:

1) Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2) Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech
3) User Interface Design, Soren Lauesen , Pearson Education

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce & Economics (AUTONOMOUS)

Program: Bachelor of Science (Computer Science)		**Semester: VI**	
Course: Project Implementation		**Course Code: USMACSP66**	
Teaching Scheme		**Evaluation Scheme**	
Learner Effort (Total Hours)	**Credit**	**Continuous Assessment(CA)**	**Semester End Examinations (SEE)**
60 - 80	2	40%	60%

Learning Objectives:

- Implementing various kinds of new technologies like Gamming Application, Data Science, Artificial Intelligence, etc.
- Identifying suitable Technologies to create the application
- Implementing or performing experiments and develop correct practices of observing the results
- Applying various techniques to evaluate results and deferring appropriate conclusions

Course Outcomes:

After completion of the course the learners will:

CO1: Design environment for computer-based problem solving
CO2: Analyse the importance of data
CO3: Demonstrate different visualization techniques
CO4: Create abstract machine environment for real life applications
CO5: Design solutions for decidable problem statements

Guidelines for Project Implementation in Semester – VI

Guidelines for Documentation of Project Implementation in Semester – VI	
1.	Title: Title of the project
2.	Preparation of Abstract
3.	Preliminary Investigation
4.	Feasibility Study
5.	Description of Modules (if any)
6.	UML Diagrams (System Analysis and Design) Or the Flow chart of the working
7.	The report may be of around 30-35 pages, which needs to be signed by the faculty in charge and head of the Department. Student should submit the signed project implementation report along with evaluated copy of the project proposal documentation at the time of Project evaluation and viva as part of the Term End examination
8.	Experimental set up and results: A detailed explanation on how experiments were conducted, what software used and the results obtained. Details like screen shots, tables and graphs can come here.
9.	Analysis of the results: A description on what the results means and how they have been arrived at. Different performing measures or statistical tools used etc. may be part of this. It shall be of 4 to 6 pages.
10.	Testing and Writing test cases: A List of tests are performed and List of test cases identify for the project

11.	Conclusion: A conclusion of the project performed in terms of its outcome (May be half a page).
12.	Future enhancement. A small description on what enhancement can be done when more time and resources are available (May be half a page)