Rayat Shikshan Sanstha's

Yashavantrao Chavan Institute of Science, Satara

SYLLABUS FOR
B. Voc. (Software Development)

Third Year SEMESTER V / VI
Year 2022-23

1. INTRODUCTION

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc.) Degree with multiple exits such as Diploma/Advanced Diploma under the NSQF. The B.Voc. Programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles along with broad based general education. This would enable the graduates completing B.Voc.to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

The proposed vocational programme in Software Development will be a judicious mix of skills, professional education related to Software Development and also appropriate content of general education. It is designed with the objective of equipping the students to cope with the emerging trends and challenges in the Software Development environment.

2. ELIGIBILITY FOR ADMISSION

Eligibility for admissions and reservation of seats for B.Voc. Software Development shall be according to the rules framed by the University from time to time. No student shall be eligible for admission to B.Voc Software Development unless he/she has successfully completed the examination conducted by a Board/ University at the +2 level of schooling or its equivalent in science stream. Those who passed Vocational Higher Secondary course will get an additional weightage of 25 marks in the ranking index. For the calculation of ranking mark in any stream, convert the qualifying examination mark to 1200.

3. NATURE OF THE COURSE

This course follows 2(b) pattern of the University under first degree CBCS program with appropriate modifications.

- No open course is envisaged
- No Electives are include
- Total credits enhanced to 180 instead of 120
- Working hours per week is increased to 30 hours
- All vocational subjects are treated as core course.
- Multiple exit points are permitted, that is, if willing, candidate can quit after the successful completion of first & second year. Candidate do so, can't be re-entered.
- There will not be provisions for improvement.
- A candidate who failed in a semester may get two supplementary chances. Only failed papers are to be written in the supplementary examination.

CURRICULUM

The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components.

4. DURATION

The duration of the B.Voc. Software Development shall be three years consisting of six semesters. The duration of each semester shall be five months inclusive of the days of examinations. There shall be at least 90 working days in a semester and a minimum 540 hours of instruction in a semester.

5. PROGRAMME STRUCTURE

The B. Voc Software Development shall include:

- Language courses (English)
- General Education Components
- Skill Components
- Project
- Industrial Training
- Soft Skills and Personality Development Programmes
- Study tours

6. CREDIT CALCULATION

The following formula is used for conversion of time into credit hours.

- One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, workshops/labs and tutorials;
- For industrial visit, the credit weightage for equivalent hours shall be 50% of that for lectures/workshops;
- For self-learning, based on e-content or otherwise, the credit weightage for equivalent hours of study should be 50% or less of that for lectures/workshops.

7. COURSE STRUCTURE

NSQF Level	Skill Component Credits	General Education Credits	Normal calendar duration	Exit Points / Awards
Year 3	36	24	Six Semesters	B.Voc.
Year 2	36	24	Four semesters	Advanced Diploma
Year 1	36	24	Two semesters	Diploma
TOTAL	**108**	**72**		

As per the UGC guidelines, there are multiple exit points for a candidate admitted in this course. If he/she is completing all the six semester successfully, he/she will get B. Voc degree in Software Development. If he/she is completing the first four semesters successfully, he/she will get an advanced diploma in Software Development. If he/she is completing the first two semesters he/she will get a diploma in Software Development. B Voc Degree holder is expected to acquire the skills needed for a software developer or entrepreneur. Advanced diploma holder is expected to become a multi-skilled Software associate. Diploma holder is expected to become Data interpreter

Semester V

General Education				Skill Component			
No.	**Title**	**Credit**	**Hrs/ Week**	**No.**	**Title**	**Credit**	**Hrs/ Week**
VS 351	Information Security	4	4	VS 354	Software Testing	4	4
VS 352	Management Information System	4	4	VS 355	Mobile Application Development	4	4
VS 353	IT and Society	4	4	VS 356	Python and AI	4	4
				VS 357	Lab: Software Testing	2	3
				VS 358	Lab: Mobile Application Development	2	3
				VS 359	Lab: Python and AI	2	3
	Total	**12**	**12**		**Total**	**18**	**18**

Semester VI

General Education				Skill Component			
No.	**Title**	**Credit**	**Hrs/ Week**	**No.**	**Title**	**Credit**	**Hrs/ Week**
VS 361	Human Resource Management	4	4	VS 364	Big Data Analysis	4	4
VS 362	Free and Open-Source software's	4	4	VS 365	Augmented and Virtual Reality	4	4
VS 363	Entrepreneurship Development	4	4	VS 366	Machine Learning	4	4
				VS 367	Lab: Big Data analysis and Machine Learning	2	3
				VS 368	Lab: AR-VR	2	3
				VS 369	Major Project	2	3
	Total	**12**	**12**		**Total**	**18**	**18**

❖ Distribution of Marks:

Sem	Paper Code	Subject	General/Skill	Credit	Cont. Hrs.	Marks ESE	Marks ISE	Total Marks
V	VS 351	**Information Security**	General	4	60	60	40	100
	VS 352	**Management of Information System**	General	4	60	60	40	100
	VS 353	**IT & Society**	General	4	60	60	40	100
	VS 354	**Software Testing**	Skill	4	60	60	40	100
	VS 355	**Mobile Application Development**	Skill	4	60	60	40	100
	VS 356	**Python and AI**	Skill	4	60	60	40	100
	VS 357	**Lab : Software Testing**	Skill	**2**	**36**	**40**	**30**	**70**
	VS 358	**Lab : Mobile Application Development**	Skill	**2**	**36**	**40**	**30**	**70**
	VS 359	**Lab : Python and AI**	Skill	**2**	**36**	**40**	**20**	**60**
VI	VS 361	**Human Resource Management**	General	4	60	60	40	100
	VS 362	**Free and Open Source Software's**	General	4	60	60	40	100
	VS 363	**Entrepreneurship Development**	General	4	60	60	40	100
	VS 364	**Big Data Analysis**	Skill	4	60	60	40	100
	VS 365	**Augmented and virtual Reality**	Skill	4	60	60	40	100
	VS 366	**Machine Learning**	Skill	2	36	40	20	60
	VS 367	**Lab : Big data Analysis & Machine Learning**	Skill	**2**	**36**	**40**	**30**	**70**
	VS 368	**Lab : AR-VR**	Skill	**2**	**36**	**40**	**30**	**70**
	VS 369	**Major Project**	Skill	**4**	**60**	**100**	**-**	**100**
		Total		**60**		**1120**	**480**	**1600**

VS 351 INFORMATION SECURITY (60)

Course Objectives: Student will be able to …

1. Aware of principles and protocols of internet works
2. Understand the basic issues in information security
3. Understand the concept of ciphers and cryptography.
4. Impart an idea on various ciphers
5. Understand the concept of digital signatures and e-mail security policies

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction to Information Security**: Attacks, Vulnerability, Security Goals, Security Services and mechanisms, Conventional Cryptographic Techniques: Conventional substitution and transposition ciphers, One-time Pad, Block cipher and Stream Cipher, Steganography.	**15**
Unit II	**Symmetric and Asymmetric Cryptographic Techniques**: DES, AES, RSA algorithms, Authentication and Digital Signatures: Use of Cryptography for authentication, Secure Hash function, Key management – Kerberos.	**15**
Unit III	**Program Security**: No malicious Program errors – Buffer overflow, Incomplete mediation, Time-of-check to Time-of- use Errors, Viruses, Trapdoors, Salami attack, Man-in-the- middle attacks, Covert channels.	**15**
Unit IV	**Security in Networks**: Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, Email Security – PGP,S/MIME.	**15**

Course Outcomes: Student should be able to …

1. Understand and explain the risks faced by computer systems and networks.
2. Identify and analyze security problems in computer systems and networks.
3. Explain how standard security mechanisms work.
4. Develop security mechanisms to protect computer systems and networks.
5. Write programs that are more secure.
6. Use cryptography algorithms and protocols to achieve computer security.

REFERENCES:

1. "Security in Computing", by Charles P. P Fleeger, Pearson Education

,4th edition,2014
2. "Cryptography and Network Security Principles and Practice", William Stallings, 4th edition, Pearson publications,2013
3. "Modern Cryptography: Theory and Practice", Wenbo Mao, Prentice Hall publication,8th edition,2012.
4. "Network Security Essentials: Applications and Standards", William Stallings, Prentice Hall publication,5th edition,2014

VS 352 MANAGEMENT OF INFORMATION SYSTEM (60)

Course Objectives: Student will be able to …

1. Understand managerial concepts and principles in the development and operation of information systems
2. Study systems analysis, IS design and project management concepts effectively
3. Identify business processes through the effective application of Management information technology concepts and practices

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction to Information System:** Introduction to systems- definition, need, types, characteristic Definition of Information, Classification of Information, Need and importance of information system, Definition and Characteristics of information system, Role of information system in business	**15**
Unit II	**Decision Making:** Decision Making Concepts, and Process, Types of Decisions Behavioral, Concepts in Decision Making, Organizational Decision-Making, MIS and Decision Making	**15**
Unit III	**Types of Information System:** Introduction, Operational and Knowledge Level- TPS (Transaction Processing System), OAS (Office Automation System), KWS (Knowledge Work System), Management and Strategic Level- MIS (Management Information System-need characteristics, DSS (Decision Support System)-need, characteristics, components, ESS (Executive Support System)-need, characteristics	**15**
Unit IV	**Applications of MIS** Financial Information System, Human Resource Information System, Production Information System, Marketing Information System	**15**

Course Outcomes: Student should be able to …

1. Interpret the fundamental principles of information systems
2. Describe the types of management and decision making
3. Demonstrate different types of IS used in business.
4. Implement various applications of MIS

REFERENCES:

1. "Management Information Systems", W. S. Jawadekar , 4th edition, McGraw Hill,2012.
2."Management Information Systems", Ramesh Behl , James O" Obrien and George M. Marakas ,10th edition, McGraw Hill edition,2010.
3. "Management Information Systems" , Dr. Milind M. Oka. 8th edition Everest Publishing House

VS 353 IT AND SOCIETY (60)

Course Objectives: Student will be able to …

1. Study concept of professionalism.
2. Understand the ethical issues in computing profession.
3. Understand the concept of Cyber law.
4. Understand concept of quality certifications.

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction:** What is a profession – who is a professional – core qualities of a professional – Environments and their impact and complexity – social attitudes, beliefs and values, Governance, Risk Management, Compliances	**15**
Unit II	**Ethics** Codes of ethics - solving ethical conflicts, moral reasoning and ethical theories– responsibilities and rights. Computer ethics : ethics and the internet – hacking – netiquette – privacy, Emotional Intelligence, Concept of business ethics	**15**
Unit III	**Quality Management** Quality Management. Concept of quality, total quality management, Statements, Quality Policy, Quality Objectives, 7 sigma principles, ISO certifications, Component maturity models, CMM Levels**,** Quality Control Tools.	**15**
Unit IV	**Cyber Law** Cyberlaw: Intellectual property rights – basic ideas – copyright concepts – copyrights applied to softwares – software licensing – patents in software – Indian copyright law and provisions for software – Indian patent law and provisions for software – various licencing models - arguments against copyrights and patents in software – free softwares – GPL software freedoms– open source software's	**15**

Course Outcomes: Student should be able to …

1. Analyze about human rights, values and beliefs.
2. Apply importance of Total Quality Management.
3. Explain importance of Professionalism
4. Identify various types of cyber law, patent law.

REFERENCES:

1. M Govindarajan, S Natarajan, V S Senthil Kumar, Engineering Ethics, PHI
2. Poornima M. Charantimath, Total Quality Management, Pearson Education
3. Richard Stallman, Free Software: A Perspective, Prajapati Book House, Hyderabad
4. Indian Copyright Act and Indian Patent Acts

VS 354 SOFTWRAE TESTING (60)

Course Objectives: Students will be able to….

1. Study fundamental concepts of software testing.
2. Understand application in various scenarios with the help different testing strategies, methods and tools.
3. Understand the testing life cycle.
4. Understand structured software testing.

Syllabus:

Unit	Topics	No of Hours Per Unit
Unit I	**Introduction:** Software Testing, Importance of testing, Roles and Responsibilities, Testing Principles, Attributes of Good Test, V-Model, Test Case Generation , SDLC Vs STLC, Software Testing Life Cycle-in detail.	**15**
Unit II	**Types of Testing:** Testing Strategies: Unit Testing, Integration Testing, System Testing, Smoke, Regression Testing, Acceptance Testing. Functional/Non- Functional Testing. Testing Tools, Categorization of testing methods. **Non Functional Testing**: Performance Test, Memory Test , Scalability Test, Compatibility Test	**15**
Unit III	**Software Testing Life Cycle:** Requirements Analysis/Design, Traceability Matrix, Test Planning, Objective, Scope of Testing, Schedule, Approach, Roles & Responsibilities, Assumptions, Risks & Mitigations, Entry & Exit Criteria, Test Automation, Deliverables.	**15**
Unit IV	**Test Cases Design:** Write Test cases, Review Test cases, Test Cases Template, Types of Test Cases, Difference between Test Scenarios and Test Cases. Test Environment setup, Understand the SRS, Hardware and software requirements, Test Data.	**15**

Course Outcome: Students should be able to….

1. Apply testing techniques in software quality management and assurance (Understand)
2. Identify various types of software risks and its impact on different software application. (Analyze)
3. Create test case scenarios for different application software's using various testing techniques. (Create)
4. Apply different testing methodologies used in industries for software testing. (Apply)

References:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Editions 2018
2. Ian Sommerville, Software engineering, Pearson education Asia 2019
3. Software Testing Techniques, 2nd edition, Boris Beizer, 1990
4. Software Testing: Principles and Practices by Srinivasan Desikan
5. Software Testing and Quality Assurance: Theory and Practice by Kshirasagar Naik andPriyadarshi Tripathy 2018

VS 355 MOBILE APPLICATION DEVELOPMENT (60)

Course Objectives: Student will be able to …

1. Study fundamental concepts Android Operating System.
2. Understand Different layouts of Android.
3. Study XML, SQLite Database.
4. Understand working of others apps.

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction to Android Development**: **Android operating System** , Open Handset Alliance (OHA),Features of Android, Android Versions, **Advantages & Disadvantages of Android Development,** Categories of Android applications, Android - Architecture	**15**
Unit II	**Android Development Tools:** Eclipse integrated development environment (IDE), Android software development kit (SDK), Application development tools (ADT) plugin, Emulators and Devices: Android virtual devices (AVDs), Dalvik Virtual Devices, Difference between JVM and DVM, Connecting Androids to the development platform, USB drivers for Android development, Android Development Lifecycle: "Hello World!", Running on the emulator, Running on a	**15**

	device	
Unit III	**XML Fundamentals:** Activity Lifecycles: Callbacks and activity pyramids, Components of a screen, Fundamental UI design, Linear Layout, Absolute Layout, Frame Layout, Table Layout, Relative Layout View & View Group-Text view, Edit Text, Button, Image Button, Toggle Button, Radio Button& Radio Group, Checkbox, Progress Bar, List View, Grid View , Image View, Scroll View, Custom Toast Alert. Time and Date Picker	**15**
Unit IV	**Interaction with Other Apps:** Interaction with Other Apps, Location-Aware Apps, Play Audio and Video, Photos and Video, Intent, Intent Filter, SQLite Database, necessity of SQLite, Creation & Connection of database Application Deployment: Creating Small Application, signing of application, Deploying app on Google Play Store.	**15**

Course Outcomes: Student should be able to …

1. Apply different Android Development Tools (IDE, SDK)
2. Identify various types of Layout and use of audio, photos and video
3. Create emulators, virtual devices and development platforms.
4. Interact with apps and network/cloud operations.

REFERENCES:

1. Android Programming for Beginners: John Horton ,2019
2. Android App Development Michael Burton ,2015

VS 356 PYTHON & ARTIFICIAL INTELLIGENCE (60)

Course Objectives: Student will be able to …

1. Understand Importance--scope and objectives of Python
2. Learn core Python scripting elements such as variables and flow control structures
3. Understand Problem Solving using various peculiar search strategies for AI
4. Introducing the learners to programming skills - Basic python coding language.

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction:** Introduction to Python, Uses of Python Programming Language / Python Applications, Features of Python, Python for Software	**15**

	development, Python for Networking, Features of Python Programming Language, Print statements, Comments, Datatypes ,String operations, Input/Output formatting, Operators in python, variables, Indentation.	
Unit II	**Control Flow & functions:** If statement and its related statements ,Looping statements- while , for loop, range statement, break and continue statements, List and tuples, Writing and Calling Functions , Function Inputs and Outputs ,Local and Global Scope, Python Class and Objects, Inheritance, File handling Concepts, modes, reading files., writing and appending to files.	**15**
Unit III	**Introduction to AI:** Basic Concept of Artificial Intelligence (AI), What is Intelligence?, Application of AI, Intelligent Agents: Agents and environments, Nature of environments, Structure of agents Problem Solving: Problem-solving agents,	**15**
Unit IV	**Searching:** Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adverbial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search	**15**

Course Outcomes: Student should be able to …

1. Identify and appreciate Artificial Intelligence and describe its applications
2. Apply problem scoping and ways to set goals for an AI project
3. Create practical and contemporary applications using Functions

REFERENCES:

1. Elaine Rich, Kevin Knight, Shivashankar B Nair, “Artificial Intelligence” third edition, McGraw-Hill
2. Introduction to Knowledge Systems, San Francisco: Morgan Kaufman, 1995.
3. Winston, Patrick Henry, Artificial Intelligence, 3rded. California: Addison Wesley, 1995.
4. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, 2nded.New Delhi, Prentice Hall of India, 1997.

VS 357 LAB : SOFTWARE TESTING (60)

Course Objectives: Students will be able to….

1. Study fundamental concepts of software testing.
2. Understand application in various scenarios with the help different testing strategies, methods and tools.
3. Understand writing Test Cases.
4. Understand how to raise defect.

Practical:

1. Read and understand the software project documentation/guides. Also, study the Application under Test (AUT) if available.
2. Draft Test cases that cover all the requirements mentioned in the documentation.
3. Review and baseline the test cases with Team Lead, Client (as applicable)
4. Execute the test cases on the AUT
5. Report bugs.
6. Once bugs are fixed, again execute the failing test cases to verify they pass.
7. Write test cases for ATM Machine.
8. Write test cases for remote control.
9. Create User Stories and Test Cases for Registration and Login Functionality
10. Raise Defect on JEERA tool.

Course Outcome: Students should be able to….

1. Apply testing techniques in software quality management and assurance (Understand)
2. Identify various types of software risks and its impact on different software application. (Analyze)
3. Create test case scenarios for different application software's using various testing techniques. (Create)
4. Apply different testing methodologies used in industries for software testing. (Apply)

VS 358 LAB: MOBILE APPLICATION DEVELOPMENT (60)

Course Objectives: Student will be able to …

1. Understand Mobile Computing and frameworks. Work with Android Development Tools (IDE, SDK).
2. Understand emulators, virtual devices and development platforms.
3. Understand XML Fundamentals.
4. Interact with apps and network/cloud operations.

Practical

1. Install/configure java development kit (JDK), android studio and android SDK.
2. Configure android development tools (ADT) plug-in and create android virtual device.
3. Develop a program to display Hello World on screen.
4. Develop a program to implement linear layout and absolute layout.
5. Develop a program to implement frame layout, table layout and relative layout.
6. Develop a program to implement Text view & Edit Text.
7. Develop a program to implement Arithmetic operations.
8. Develop a program to implement Checkbox.
9. Develop a program to implement Date and Time Picker.
10. Develop a program to implement Radio Button & Radio Group.
11. Develop a program to implement list view, Grid view, and Image view and scroll view.
12. Develop a program to implement Custom Toast Alert.
13. Develop a program to implement new activity using explicit intent and implicit intent.
14. Create sample application with login module (check username and password) on successful login, change Text View "Login Successful". And on login fail, alert user using Toast "Login fail".
15. Develop a program: a) Send SMS b) Receive SMS

Course Outcomes: Student should be able to …

1. Install and Configure Android IDE.
2. Create, Compile and run Programs.
3. Write a short introductory program
4. Use the emulator to test the app
5. Create layout, use audio, photos and video.

VS 359 LAB: AI WITH PYTHON (60)

Course Objectives: Student will be able to …

1. Understand the basic concepts of scripting and the contributions of scripting language.
2. Ability to explore python data structures like Lists, Tuples
3. Ability to create practical and contemporary applications using Functions, Modules and Regular Expressions.

Practical

1. Install and configure Python IDE
2. Write simple Python program to display message on screen
3. Write simple Python program using operators: a) Arithmetic Operators b) Logical Operators c) Bitwise Operators
4. Write simple Python program to demonstrate use of conditional statements:

b. 'if' statement b) 'if … else' statement c) Nested 'if' statement d) 'while' loop e) 'for' loop

2. f) Nested loops
3. Write a program in Python to demonstrate classes and object.
4. Write a program in Python to demonstrate following operations: a) Simple inheritance b) Multiple inheritance
5. Write a Python program to read an entire text file
6. Write a Python program to append text to a file and display the text
7. Write a python program to implement Breadth First Search Traversal?
8. Write a Program to Implement Depth First Search using Python.
9. Write a program to implement Hangman game using python.
10. Write a python program to implement Water Jug Problem?

Course Outcomes: Student should be able to …

1. Install and Configure Python IDE.

2. Create, Compile and run Programs.

3. Introduce core programming basics and various Operators of Python programming language.

4. Implement simple heuristic functions and to use those for best-first search problems.

SEM-VI

VS 361 HUMAN RESOURCE MANAGMENT (60)

Course Objectives: Student will be able to …

1. Understand Importance--scope and objectives of HRM
2. Study oneself- confidence building- defining strengths- thinking creatively- personal values-time and stress management
3. Understand Group discussion- mock Group Discussion

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction**: Human Resources Management - Definition - Objectives - Functions - Scope - Importance - HRM in India - Evolution of HRM - Computer Application in Human Resource Management - Quality of a good Human Resource Managers - Human Resource Planning - Job Analysis, Job description and Job Specification. Organization and Functions of the HR and Personnel Department - HR Structure and Strategy; Role of Government and Personnel Environment including MNCs	**15**
Unit II	**Skills**: Recruitment and Selection - Human Resource Information System [HRIS] - Manpower Planning - Sources of Recruitment - Selection Process - Test Types - Interview Types - Career Planning - VS Man Power Planning and succession Planning – Induction & Orientation - Performance and Potential Appraisal - Coaching and Mentoring - HRM issues and practices in the context of Outsourcing as a strategy	**15**
Unit III	**Personality Development:** Training and Development Methods - Design & Evaluation of T&D Programme - Career Development - Promotions and Transfers - Personnel Empowerment including Delegation - Retirement and Other Separation Processes.	**15**
Unit IV	**Presentation skills:** Financial Compensation- -Productivity and Morale - Principal Compensation Issues & Management - Job Evaluation - Productivity, Employee Morale and Motivation - Stress Management - Quality of Work Life. Nature of Trade Unions - Problems of Trade Union - Measures to Strengthen Trade Union Movement in India - Causes for Industrial Disputes - Settlement of Industrial Disputes.	**15**

Course Outcomes: Student should be able to …

1. Develop an ability to undertake qualitative and quantitative research
2. Apply knowledge about qualitative and quantitative research to an independently constructed piece of work
3. Respond positively to problems in unfamiliar contexts
4. Identify and apply new ideas, methods and ways of thinking
5. Demonstrate competence in communicating and exchanging ideas in a group context

REFERENCES:

1. Erfan Turban et.al.,Electronic Commerce–A Managerial Perspective, Pearson Education(Unit I-Unit IV)
2. R Kalokota, Andrew V. Winston, Electronic Commerce – a Manger's guide, Pearson (Unit I-Unit IV)
3. Digital Marketing for Dummies by Ryan Deiss and Russ Henneberry,2016

VS 362 FREE AND OPEN SOURCE SOFTWARES (60)

Course Objectives: Student will be able to …

1. Familiarize students with the Linux environment, and able to run commands on a standard Linux operating system.
2. Study the various applications using build systems
3. Understand the installation of various packages in open source operating systems
4. Understand the kernel configuration and virtual environment

SYLLABUS:

Unit	Topic	Hours
Unit I	Linux Basics: History of Linux: (History, FOSS, current Linux Distributions examples), Linux Operating System Layers, The Linux Shell (different kinds of shell), Process: (parent and child processes), Files and Directories (File Structure and directory structure), Interaction with System.	**15**
Unit II	**Getting Started With Shell Programming**: The bash shell, Shell commands , Variables in shell :(Assign values to shell variables, Default shell variables value , Rules for Naming variable name, Display the value of shell variables, Quoting, The export statement, Unset shell and environment variables	**15**
Unit III	**Basic Administration**: Basic System Administration (Run levels, User accounts),Kernel Administration: (Linux kernel sources, rebuilding kernel, installing kernel), Managing Users, Managing File Systems, Linux File Permissions, Devices and Modules (device drivers)	**15**
Unit IV	**Files Systems and Editing Files**: File Systems, Linux Files,	**15**

	Directories and Archives, The vi editor, awk, sed. Software Management, Office and Database Applications, Graphics Tools and Multimedia, Mail and News Clients, Web, FTP, and Java Clients, Security: Encryption, Integrity Checks, and Signatures, Security-Enhanced Linux, Secure Shell and Kerberos, Firewalls	

Course Outcomes: Student should be able to …

1. Identify and use Linux utilities to create and manage simple file processing operations.
2. Develop shell scripts to perform more complex tasks in shell programming environment.
3. Illustrate file processing operations such as standard I/O and formatted I/O.

REFERENCES:

1. K. A. Robbins, "Unix System Programming, Communication, Concurrency and Threads", Pearson Education.
2. S. G. Kochan and P. Wood, "Unix Shell Programming", 3rd Edition, Pearson Education.
3. B. A. Forouzan and R. F. Gilberg, "Unix and Shell Programming", Cengage Learning.
4. Robert Love, "Linux System Programming", O'Reilly, SPD

VS 363 ENTREPRENEURSHIP DEVELOPMENT (60)

Course Objectives: Student will be able to …

1. Familiarize the students with the latest programs of the government authorities in promoting small and medium industries.
2. Impart knowledge regarding how to start new ventures
3. Introduce various qualities required for entrepreneurship
4. Study various entrepreneurship models

SYLLABUS:

Unit	Topic	Hours
Unit I	**Concepts of entrepreneur:** Entrepreneur- Definitions-Characteristics of entrepreneur-Classification of entrepreneur-Entrepreneurial traits-Entrepreneurial functions- role of entrepreneurs in the economic development- Factor effecting entrepreneurial growth-Entrepreneurship - Meaning- definition- Entrepreneur Vs Intrapreneur- Women Entrepreneurs- Recent Development-Problems-Entrepreneurial Development Programmes- Objectives of EDP- Methods of training- Phases of EDP	**15**

Unit II	**Institutional support and incentives to entrepreneurs:** Functions of Department of Industries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)- Functions of National Small Industries Corporation(NSIC)- Functions of Small Industries Development Bank of India (SIDBI)-Khadi Village Industry Commission (KVIC)- Small Industries Service Institute (SISI)- Functions and services of Kerala Industrial Technical Consultancy Organization (KITCO)- Activities of Science and Technology Entrepreneurship Development Project (STEDP)-Strategies of National entrepreneurship Development Board(NEDB)-Objectives of National Institute for entrepreneurship and small business development (NIESBUD)- Techno park-Functions of techno park Incentives- Importance- Classification of incentives- Subsidy- Types of Subsidy	**15**
Unit III	**Micro Small and Medium Enterprises-** Features- Objectives- Importance- Role of SME in the economic development- MSME Act 2006- Salient features- Credit Guarantee Fund Trust Scheme for MSMEs - Industrial Estates- Classification-Benefits-Green channel- Bridge capital- Seed capital assistance-Margin money schemes –Single Window System- Sickness- Causes –Remedies- Registration of SSI	**15**
Unit IV	**Setting up of Industrial unit- (Only Basic study)** : Environment for Entrepreneurship –Criteria for selecting particular project- Generating project ideas-Market and demand analysis- Feasibility study- Scope of technical feasibility- Financial feasibility- Social cost benefit analysis-	**15**

Course Outcomes: Student should be able to …

1. Identify qualities of entrepreneurs
2. Write project proposal
3. Use various entrepreneurship models
4. Apply various schemes supporting entrepreneurship
5. Think creative and innovative

REFERENCES:

1. SangramKeshariMohanty, Fundamentals of entrepreneurship,PHI,New Delhi.
2. Nandan H. Fundamentals of Entrepreneurship,PHI, NewDelhi.
3. Small-Scale Industries and Entrepreneurship, Himalaya Publishing ,Delhi
4. C.N.Sontakki,ProjectManagement,Kalyani Publishers, Ludhiana.

VS 364 BIG DATA ANALYSIS (60)

Course Objectives: Student will be able to …

1. Study overview of an exciting growing field of big data analytics.
2. Introduce the tools required to manage and analyze big data like Hadoop, NoSqlMap-Reduce.
3. Understand the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
4. Study to solve complex real-worldproblems in for decision support.

SYLLABUS:

Unit	Topic	Hours
Unit I	Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach, Case Study of Big Data Solutions.	**15**
Unit II	What is Hadoop? Core Hadoop Components; Hadoop Ecosystem; Physical Architecture; Hadoop limitations.	**15**
Unit III	What is NoSQL? NoSQL business drivers; NoSQL case studies; NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Bigtable) stores, Document stores, Variations of NoSQL architectural patterns. using NoSQL to manage big data: What is a big data NoSQL solution? Understanding the types of big data problems; Analyzing big data with a shared-nothing architecture; Choosing distribution models: master-slave versus peer-to-peer; Four ways that NoSQL systems handle big data problems.	**15**
Unit IV	Distributed File Systems : Physical Organization of Compute Nodes, Large-Scale File-System Organization. MapReduce: The Map Tasks, Grouping by Key, The Reduce Tasks, Combiners, Details of MapReduce Execution, Coping With Node Failures. Algorithms Using MapReduce: Matrix-Vector Multiplication by MapReduce , Relational-Algebra Operations, Computing Selections by MapReduce, Computing Projections by MapReduce, Union, Intersection, and Difference by MapReduce, Computing Natural Join by MapReduce, Grouping and Aggregation by MapReduce, Matrix Multiplication, Matrix Multiplication with One MapReduce Step.	**15**

Course Outcomes: Student should be able to …

1. Analyze the key issues in big data management and its associated applications in intelligent business and scientific computing.
2. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.

3. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
4. Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

REFERENCES:

1. Bill Franks , "Taming The Big Data Tidal Wave: Finding Opportunities In Huge
2. Data Streams With Advanced Analytics", Wiley
3. Chuck Lam, "Hadoop in Action", Dreamtech Press
4. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, "Big Data for
5. Dummies", Wiley India
6. Michael Minelli, Michele Chambers, Ambiga Dhiraj, "Big Data Big Analytics: Emerging Business Intelligence And Analytic Trends For Today's Businesses", Wiley India

VS 365 AGUMENTED AND VIRTUAL REALITY (60)

Course Objectives: Students will be able to….

1. Understand the basic concepts of Virtual and Augmented Reality
2. Study the differences in AR/VR concepts and technologies
3. Understand the fundamental concepts relating to Virtual Reality such as presence, immersion, and engagement
4. Understand usability of AR/VR applications and critique their use of AR/VR capabilities
5. Learn Design and prototype effective AR/VR applications using UNITY platform for business, industry, non-profit and government organizations

Unit	Topics	No of Hours Per Unit
Unit I	**Introduction to Augmented Reality (AR And VR)** **Augmented Reality (AR):** Definition and Scope, A Brief History of Augmented Reality, Displays (Multimodal Displays, Spatial Display Model, and Visual Displays), Strong vs Weak AR, Applications of AR, Challenges in AR. **Virtual Reality (VR):** Definition and Scope, Types of VR, Characteristics of VR, Basic VR environments, Limitations of VR environments, Immersion Vs	**15**

	Presence, Key hardware requirements for VR.	
Unit II	**Interaction design for AR/VR environments** Interaction design process, Identifying user needs, AR/VR design considerations, Typical AR/VR Interface Metaphors, Affordances in AR/VR, Human Information Processing, Design for Perception and cognition, User experience(UX) guidelines for AR/VR, UX challenges for AR/VR , Prototyping for AR/VR, Evaluation of the developed AR/VR prototype.	**15**
Unit III	**Introduction to UNITY** Unity Overview: Windows, Interface, Navigation, Terminology, Game Objects, Hierarchy, Parenting Objects, Asset Store, Importing Plug-ins, Creating a Terrain, Materials, Colors, Transparency, Introduction to Mono behaviors: Awake, Start, Update.	**15**
Unit IV	**Introduction to Vuforia and Physics in UNITY** Vuforia Overview: Interface, Navigation, Terminology, Image Targeting, Custom Images, Overview of Physics in Unity, Introduction to Scripting: Terminology, Creating Objects, Accessing Components, Debugging, Lists, Loops	**15**

Course Outcome:

Students should be able to….

1. Apply the basics of Augmented and Virtual reality systems and list their applications.
2. Describe interface to the Virtual World with the help of input and output devices
3. Analyze manipulation, navigation and interaction of elements in the virtual world
4. Summarize the basic concepts and hardware of Augmented Reality system.
5. Create Mobile Augmented Reality using Augmented Reality techniques and software.

References:

1. Azuma, R.T. (1997). A survey of augmented reality. Presence: Teleoperators & Virtual Environments, 6(4), 355–385.
2. Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & MacIntyre, B. (2001). Recent advances in augmented reality. IEEE computer graphics and applications, 21(6), 34-47
3. Bhagat, K. K., Liou, W.-K., & Chang, C.-Y. (2016). A cost-effective interactive 3D virtual reality system applied to military live firing training. Virtual Reality, 20(2), 127-140. doi:10.1007/s10055-016-0284-x.

4. Carmigniani, J., Furht, B., Anisetti, M., Ceravolo, P., Damiani, E., & Ivkovic, M. (2011). Augmented reality technologies, systems and applications. Multimedia tools and applications, 51(1), 341-377.

5. Schuemie, M. J., Van Der Straaten, P., Krijn, M., & Van Der Mast, C. A. (2001). Research on presence in virtual reality: A survey. Cyber Psychology & Behavior, 4(2), 183-201.

VS 366 MACHINE LEARNING (60)

Course Objectives: Student will be able to …

1. Understand the basic theory underlying machine learning.
2. Formulate machine learning problems corresponding to different applications.
3. Understand a range of machine learning algorithms along with their strengths and weaknesses.
4. Study machine learning algorithms to solve problems of moderate complexity.
5. Understand the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

SYLLABUS:

Unit	Topic	Hours
Unit I	**Introduction and python ecosystem** What is Machine Learning? Need for Machine Learning, Why & When to Make Machines Learn? Machine Learning Model, Challenges in Machines Learning, Applications of Machines Learning, An Introduction to Python, Strengths and Weaknesses of Python, Installing Python, Why Python for Data Science? Components of Python ML Ecosystem, Jupyter Notebook, Types of Cells in Jupyter Notebook.	**15**
Unit II	**Methods for Machine Learning and Data Loading** Different Types of Methods, Tasks Suited for Machine Learning- Batch Learning, Online Learning, Based on Generalization Approach, Instance based Learning, Model based Learning, Consideration While Loading CSV data, Methods to Load CSV Data File Load CSV with NumPy Load CSV with Pandas	**15**
Unit III	**Data with Visualization & Preparing Data:** Introduction, Univariate Plots: Understanding Attributes Independently, Density Plots, Box and Whisker Plots, Multivariate Plots: Interaction Among Multiple Variables, Correlation Matrix Plot, Scatter Matrix Plot, Introduction, Why Data Pre-processing? Data Pre-processing Techniques, Normalization, Types of Normalization, Binarization, Standardization, Data Labelling	**15**
Unit IV	**Classification Algorithm:**	**15**

	Introduction to Classification, Types of Learners in Classification, Building a Classifier in Python, Classification Evaluation, Metrics, Confusion Matrix, Various ML Classification Algorithms, Applications	

Course Outcomes: Student should be able to …

1. Appreciate the importance of visualization in the data analytics solution
2. Apply structured thinking to unstructured problems
3. Create very broad collection of machine learning algorithms and problems
4. Develop an appreciation for what is involved in learning from data.

REFERENCES:

1. Manaranjan Pradhan, U Dinesh Kumar ," Machine Learning Using Python", Wiley publisher, 1 January 2019,5th edition.
2. Dr. R. Nageswara Rao ," Machine Learning in Data Science Using Python", Dreamtech Press publication,May 2022,4th edition
3. Dr. R. Nageswara Rao,"Core Python Programming", Dreamtech Press,Sept-2022,3rd edition.

VS 367 LAB: BIG DATA ANALYSIS AND MACHINE LEARNING (60)

Course Objectives: Student will be able to …

1. Introduce the tools required to manage and analyze big data like Hadoop, NoSql Map-Reduce.
2. Learn the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
3. Understand the basic theory underlying machine learning.
4. Formulate machine learning problems corresponding to different applications.

Practical

1. Study of Hadoop ecosystem
2. 2 programming exercises on Hadoop
3. 2 programming exercises in No SQL
4. Implementing simple algorithms in Map- Reduce (3) - Matrix multiplication,Aggregates, joins, sorting, searching etc.
5. Implementing any one Frequent Itemset algorithm using Map-Reduce
6. Implementing any one Clustering algorithm using Map-Reduce
7. Implementing any one data streaming algorithm using Map-Reduce
8. Mini Project: One real life large data application to be implemented (Use standardDatasets available on the web)
   a) Twitter data analysis
   b) Fraud Detection
   c) Text Mining etc.

Course Outcomes: Student should be able to …

1. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
2. Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
3. Appreciate the importance of visualization in the data analytics solution
4. Apply structured thinking to unstructured problems

VS 368 LAB: AGUMENETED AND VIRTUAL REALITY (60)

Course Objectives: Students will be able to….

1. Understand the basics of Augmented and Virtual reality systems and list their applications.
2. Describe interface to the Virtual World with the help of input and output devices
3. Analyze manipulation, navigation and interaction of elements in the virtual world
4. Study usability of AR/VR applications and critique their use of AR/VR capabilities.

Practical:

1 Study of different game engines

2 Implementation on Video/ Feature Viewing

3 Implementation on Virtual tour

4 Implementation on material animation

5 Implementation to show portal planets

6 Place object in AR with mobile gesture

7 Rotate and scale AR Objects using sliders

8 Use touch gestures to scale, rotate, and drag AR objects

9 Use canvas and text to create a scoreboard

10 Mini Project on Augmented Reality or Virtual Reality

Course Outcome: Students should be able to….

1 Create the basics of Augmented and Virtual reality systems and list their applications.

2 Describe interface to the Virtual World with the help of input and output devices

3 Analyze manipulation, navigation and interaction of elements in the virtual world

4 Create Mobile Augmented Reality using Augmented Reality techniques and software.

VS 368 LAB: MAJOR PROJECT (60)