Third Semester

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	Descriptive Analytics				
Code	BCADS13201				
Course Type	DSC	L	T	P	Credit
Pre-Requisite		3	1	0	4
Course Objectives	Understand how analytics provided a solution to industries using real case studies. To learn the importance of analytics and how it's transforming the world today. Describe a reporting application, its interface, and the different report types and prompts. Learn the implementation of conditional formatting and different layout to work on.				
Course Outcomes					
CO1	To understand and implement the concept of configuring and using IBM Cognitive Analytics Tool.				
CO2	Understand how a business analysis software works, and its architecture				
CO3	Create different types of advanced reports.				
CO4	Learn to create gauge, pie charts and RAVE visualizations.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Changing business with data insight Overview:** Understand how analytics is transforming the world, Understand the profound impact of analytics in business decisions, Understand what is analytics and how it works, Understand why business analytics has become important in various industries, Understand the history of analytics and how it has changed today, Understand how to analyze unstructured data, Understand how analytics is making the world smarter, Understand where the future of analytics lies, Explain why successful enterprises need business analytics, Understand how business analytics can help turn data into insight, Understand how predictive analytics is transforming all types of organizations, Explain how analytics supports retail companies, Understand how analytics can reduce crime rates and accidents, Explain the use of analytics in law enforcement and insurance companies, Understand how analytics can affect the future of education, Predictive Analytics Modeler, Big Data Developer, Data Warehouse Developer.	15	CO1
2	**IBM Cognos Analytics for Consumers:** Introduction to IBM Cognos Analytics – Reporting What is IBM Cognos Analytics – Reporting, Explore the environment, Examine the side panel, Explore authoring templates, Generate the report, Create list reports Examine list reports, Group data, Format list columns, Include list headers and footers Focus reports using filters Create filters, Filter your data with advanced detail filters, Create crosstab reports Create a crosstab report, Add measures to crosstab reports, Data sources for crosstabs.	15	CO2
3	**Accessing the data warehouse and present data graphically:** Extend reports using calculations Derive additional information from the data source, Add run-time information to your report, Add Date/Time functions to your report, Add string functions to your report. Information integration	15	CO3

	Components, Functions, Information integration, The challenges, Data workflow, Present data graphically Create a chart report, Different chart options, Create charts containing peer and nested items, Create and reuse custom chart palettes, Add data-driven baselines and markers to charts, Focus reports using prompts Examine parameters and prompts, Create a parameter item on the report, Build a prompt page, Add a prompt item to a report, Use additional report building techniques Enhance report design, Add objects, Organize objects using tables, Break a report into sections, Convert a list to a crosstab, Reuse objects within the same report.		
4	**Wrap up and planning considerations and customize reports:** Wrap up and Planning considerations Summary and Planning Considerations, Data insight, The big picture, Bringing all together, Suggestions for success. Customize reports with conditional formatting Change displays based on conditions, 3 steps for conditional formatting, Step 1. Create a variable, Step 2. Assign the variable to a report object, Step 3. Apply formatting to object based on condition value. Drill through definitions Let users navigate to relate data in IBM Cognos Analytics, Set up drill-through access from a report, Package-based drill through, Specify the values passed to target parameters, Steps to set up a package-based drill through definition, Limit the items that users can drill through from, Drill Through Assistant. Enhance report layout View the structure of the report, Force page breaks in reports, Horizontal pagination, Modify structures	15	CO4

Suggested Readings

1. Holden Karau, "Learning Spark: Lightning-Fast Big Data Analysis", Shroff/O'Reilly
2. Dr. Charles Russell,"Python for Everybody: Exploring Data in Python 3", Severance Managing Your Business.
3. IBM Courseware

Online Resources

1. https://onlinecourses.nptel.ac.in/noc24_cs65/preview

Course Articulation Matrix														
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2		1		2	1	2	2	2	2
CO2	2	2	2	3	2	1	1		2	1	1	2	2	2
CO3	2	1	3	2	2		1		2	1		2	2	2
CO4	2		2		2	2	1		1		1	2	2	2

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	NO SQL with Dbaas 101				
Code	BCADS13202				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	2
Course Objectives	Students will understand fundamental concepts of a number of different NOSQL products. Students will also learn various CRUD operations and the querying mechanisms in NOSQL. Students will also comprehend with advanced topics. Use the MongoDB tools to develop and deploy your applications. Implement Java/ Python / PHP web application for a real world problem with MongoDB.				
Course Outcomes					
CO1	Define, compare and use the four types of NoSQL Databases (Document-oriented, Key Value Pairs, Column-oriented and Graph).				
CO2	Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.				
CO3	Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.				
CO4	Demonstrate an understanding of the detailed architecture; define objects, load data, query data and performance tune Key-Value Pair NoSQL databases.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	Definition of NOSQL, History of NOSQL and different NOSQL Products Interfacing Exploring Mongo DB java, Exploring Mongo DB Ruby/Python, Interfacing and Interacting with NOSQL Interacting with NOSQL.	7	CO1
2	Data Model Design (Embedded Data Models and Normalized Data Models), Querying NOSQL stores, Modifying Data Stores and Managing Evolution MongoDB Use Cases, Understanding the NOSQL architecture, Understanding the, NOSQL architecture, Understanding the, NOSQL architecture, Performing CRUD.	8	CO2
3	NOSQL in cloud, Parallel Processing with Map Reduce, Big Data with Hive Surveying Database, Migrating from RDBMS to NOSQL, Query for All Documents in a Collection, Query by a Top Level Field.	7	CO3
4	Batch Processing, Data Aggregation, Indexing, Replication via Replica Sets, Query by a Field in an Embedded Document, Query by a Field in an Array, Specify Conditions with Operators, Combine Condition, Auto-Sharding, Shard Keys, Horizontal Scalability, MongoDB-Java/Python.	8	CO4

Suggested Readings:

1. IBM Courseware
2. David Hows, "The definitive guide to MongoDB", 2nd edition, Apress Publication, 2009, 8132230485.
3. Shakuntala Gupta Edward, "Practical Mongo DB ", Second edition, Apress Publications, 2016, ISBN 1484206487

Online Resources:

1. https://archive.nptel.ac.in/noc/courses/noc17/SEM2/noc17-cs33/

Course Articulation Matrix													
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2		1		2	1	2	2	2	2
CO2	2	2	2	3	2	1	1		2	1	1	2	2	2
CO3	2	1	3	2	2		1		2	1		2	2	2
CO4	2		2		2	2	1		1		1	2	2	2

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	Linux and Shell Programming				
Code	BCADSN13203				
Course Type	DSC	L	T	P	Credit
Pre-Requisite		3	1	0	4
Course Objectives	To present the fundamental concepts of LINUX. To get an understanding of Multiuser, Multitasking and Timesharing System. To introduce the significance of Open Source Software. Introduction of GUI of LINUX. Introduction of Shell programming for solving various problems.				
Course Outcomes:					
CO1	Develop the understanding of LINUX Operating System.				
CO2	Get the understanding of Redirection, Filters and LINUX Utilities.				
CO3	Ability to understand the functioning of vi editor.				
CO4	Ability to write Shell Scripts using Linux commands.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to LINUX:** Difference between UNIX & LINUX, Features of LINUX, LINUX system organization (the kernel and the shell), Files and directories, Hierarchical File Structure, Basic LINUX Commands: PATH, man, echo, passwd, uname, who, date, stty, pwd, cd,mkdir, rmdir, ls, cp, mv, rm, cat, more, wc.; Introduction to LINUX file system: Boot block, super block, Inode table, data blocks; Library Functions versus System Calls	15	CO1
2	**Input Output Redirection & LINUX Utilities:** Input Output Redirection, File handling utilities; Security by file permissions: chmod, umask, sticky bit; disk utilities-du, df; find & ulimit; Process utilities; Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.	15	CO2
3	**vi editor:** Types of editors, Basic features, modes of execution in vi editor, commands for Creating & saving a file and quitting from vi, Cursor movement, Text insertion, changing and replacing text, deleting text, searching the text, Pattern Matching of text, various options to :set command, Writing, Compiling and Running a C program on Linux.	15	CO3
4	**Shell Programming:** Types of shells, Shell Meta characters, Shell keywords, Shell variables, Scripting Basics , Creating Shell scripts, Shell commands, the environment, Environmental Variables, Integer arithmetic and string manipulation, Special command line characters; Decision making and loop control; File Tests, String Tests, continue and break; Using positional parameters, changing Positional Parameters, Generating Output, Handling Input, Exit Status of a Command, eval Command; Argument Validation, Debugging Scripts, Script Examples, Arrays; String Functions, Mathematical Functions, User – Defined Functions, Applications	15	CO4

Suggested Readings:

1. Sumitabha Das, "Unix Concepts and Applications", TMH.
2. Yashwant Kanetkar, "Unix Shell Programming", BPB.
3. Parata, "Advanced Unix–A Programmer's Guide", BPB.
4. Behrouz A. Forouzan, Richard F. Gilberg, "Unix and shell Programming", Thomson Asia
5. M.G. Venkateshmurthy, "Unix & Shell Programming", Pearson Education

Online Resources:

1. http://www.nptel.com/computerscience/Linuxprogramming
2. http://manuals.bioinformatics.ucr.edu/home/linux-basics

Course Articulation Matrix													
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	1	1	2	1		1			2	1	1
CO2	2		2	1	2	2	1		1			2	2	1
CO3	2		2	1	2	2	1		2			2	1	2
CO4	2		3	2	1	2	1		1			3	1	2

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	Computer Network				
Code	BCADSN13204				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		3	1	0	4
Course Objectives	To introduce basic elements of communication system. To understand channels, techniques and devices used to transmit data between distant locations through different devices. To introduce the functions of different layers of reference model. Understand different protocols and network components.				

Course Outcomes	
CO1	To describe and analyze the hardware, software, and various components of a communication network.
CO2	Able to explain networking protocols models and devices with their hierarchical relationship. Compare protocol models and select appropriate protocols for a particular design.
CO3	Able to classify networks, transferring of data, address of data packets, analyzing performance, and understanding concepts of data connection and transfer.
CO4	Able to Identify infrastructure components and their roles they serve, and design infrastructure including devices, topologies, protocols, systems software, management and security.

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Data Communications:** Basic Data Communication System: Data, Signaling and Transmission System; Synchronous and Asynchronous Transmission; Transmission modes and media. **Introduction to Computer Network:** Definition; Goals and Application of Computer Network; Types of Networks: Point to point, Multipoint, Types of Topologies (PAN, LAN, MAN, WAN), Centralized, Distributed and Collaborative; Type of Data Communication System: Wired and Wireless communication.	15	CO1
2	**Introduction to Network Connections:** Introduction to Internet, Intranet, Extranet, VPNS. Bandwidth, Band and Channel Capacity: Nyquist Capacity and Shannon Capacity Formula. **Network Architecture:** Monolithic v/s Layered Approach; Design Issues of Layered approach; Services, Interfaces, Standards and Protocols; ISO- OSI Reference Model and TCP/IP Model; Multiplexing: SDM, FDM, TDM, WDM; Switching: Circuit, Message, Packet; PSTN & ISDN: Narrowband and Broadband. **Subnet Communication:** Concept of Subnet & Host-to-Host Communication; Intermediate Devices: Repeaters and Regenerators, Hub, Switch, Router, Gateway. **Physical Layer:** Design Issues, Services, Protocols.	15	CO2
3	**Data Link Layer:** Framing, Error Control-VRC,LRC,CRC, Checksum, Flow Control- Hamming Code; LLC and MAC Sub-layer; DLL Protocols: Stop-and-wait Protocol, Sliding Window Protocols, Go-Back-N protocol; Subnet	15	CO3

	Communication**:** LAN Protocols: IEEE protocol. **Network Layer:** Routing, Congestion Control, QoS, Internetworking; Routing Algorithms: Distance Vector Routing, Link State; IP Addressing: IPV4 & IPV6, Firewalls. **Transport Layer:** Connection Management, Multiplexing, Segmentation and Reassembly Host- to-Host Flow Control, Acknowledge and Error Control; Transport Protocol: Connection-oriented TCP and Connection-less UDP.		
4	**Session Layer** Logical Session Management, QoS, Token Management; Synchronization; Event Management; Exception Handling. **Presentation Layer:** Data Presentation, Compression and Encryption; Data Compression: Text, Image, Audio and Video; Cryptography; Symmetric and Asymmetric Encryption; Private Key and Public Key Encryption. **Application Layer:** HTTP, HTTPS, Internet Browser, FTP, Telnet, DNS, Email System.	15	CO4

Suggested Readings

1. W. Stallings, "Data and Computer Communication", Pearson Education.
2. A. S. Tanenbaum, "Computer Network", Pearson Education.
3. Behrouz A. Forouzan, "Data Communication and Networking", Tata McGraw Hill.

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105183/

Course Articulation Matrix													
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	1s	2		1		2	1	1	2	2	2
CO2	2	2	2	1	2	1	1		2	1	1	2	2	2
CO3	2	1	3	1	2		1		2	1		2	2	2
CO4	2		2		2	2	1		1		1	2	2	2

Program	Bachelor of Computer Applications (DS & AI)				
Year	II	Semester		III	
Course Name	Object Oriented Programming Using Java				
Code	BCADSN13205				
Course Type	DSC	L	T	P	Credit
Pre-Requisite		3	0	0	3
Course Objectives	The main objective of this subject is to introduce the fundamental concepts of object-oriented Programming, show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding andperformance standard.				
Course Outcomes					
CO1	To understand the concept of object-oriented programming and implement it in Java.				
CO2	To understand building blocks of OOPs language, class, objects and method etc.				
CO3	Able to understand inheritance, package and interfaces concepts.				
CO4	To implement multithreading in object-oriented programs and designing GUI using AWT Control and event handling.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Java:** Evolution of Java, Features of Java, Byte Code and Java virtual machine, JDK, Structure of Simple Java Program, Compiling and Interpreting Applications; Java Tokens: Java Character set, Keyword and Identifiers; Data Types, Operators and Expression; Control Statements, Looping; **Array and String:** Single and Multidimensional Arrays, String Class, StringBuffer Class, Operations on String, CommandLine Argument, and Use of Wrapper Class.	12	CO1
2	**Classes, Objects & Methods:** Class, Object, Object Reference, Methods in Java, Method Overloading, Constructor, Constructor Overloading, Passing and Returning Object from method; new Operator; this & Static Keyword; finalize() method; Visibility modifiers; Nested Class; Inner Class.	12	CO2
3	**Inheritance and Polymorphism:** Inheritance in Java, Types of Inheritance, Member Access Rule, Use of this and Super Keyword, Abstract class, Dynamic Method Dispatch, Use of final Keyword; **Package & Interface:** Defining and Importing Packages, Defining and Implementing Interfaces, Extending Interfaces; **I/O STREAM:** Concept of Streams, Streams Classes: Byte and Character Stream, Reading Console input & Writing Console output.	12	CO3
4	**Exception Handling:** Exception Type, Usage of try, catch, throw, throws and finally Keywords, Creating Own Exception Classes; **Multi-Threading:** Concept of Thread, Thread Life Cycle, Creating Thread Using Thread Class and Runnable Interface, Thread Priority; **AWT Control:** The AWT Class Hierarchy, User Interface Components: Labels, Button, Text Components, Check Box, Check Box group, Choice, List Box, Panels, Working with Frame Class, Fonts and Layout Manager; **Event Handling:** Events, Event Sources, Event Listeners, EDM, Handling Mouse and Keyboard Events.	12	CO4

Suggested Readings

1. Herbert Schild, "The Complete Reference, Java 2", TMH.
2. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers.
3. E. Balaguruswamy, "Programming with Java A Primer", TMH.
4. Udit Agrawal, "Internet and Java Programming", Dhanpat Rai & Co.

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105191/

Course Articulation Matrix														
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	2	1	2	1	1		3	1	2	2	2	2
CO2	2	1	1	1	2	3	1		1			2	2	2
CO3	1	2	2	2	2	2	1		2	1	1	1	2	2
CO4	2	3	1	2	1	3	1		2		2	1	2	2

Program	Bachelor of Computer Applications (DS & AI)				
Year	II	Semester	III		
Course Name	Information & Data Security				
Code	BCADSN13211				
Course Type	GE	L	T	P	Credit
Pre-Requisite		3	1	0	4
Course Objectives	In this course, student will systematically study the fundamental principles of computer system security, including access control, security policies, software vulnerabilities, web security and various authentication mechanisms.				
Course Outcomes					
CO1	To understand the basics of information security.				
CO2	To learn about how to maintain the information and data security i.e., confidentiality, integrity and availability.				
CO3	Understanding the basic concept of security policies.				
CO4	The student will be able to understand the basics of security, policies, cryptographic algorithms, and its issues along with its countermeasures				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Introduction to Information Security:** Principles, CIA (Confidentiality, Integrity, Availability), Aspects of Information Security, Need for Security, Goals of Information Security, Features of a Good Security Policy, Security Attacks, Virus, DoS, Worms, Spyware, Ransomware, Security Services and Mechanisms, Security Standards.	15	CO1
2	**Principles of Security**: Steganography, Cryptographic Techniques: Plain Text and Cipher Text, Substitution Techniques, Types of Substitution Techniques, Transposition Techniques, Types of Transposition Techniques, Block Cipher Principles, Block Cipher Modes of Operation, Encryption and Decryption, Data Encryption Standard (DES) Algorithm, Strength of DES.	15	CO2
3	**Introduction to Security Policies:** Confidentiality, Integrity, Availability and Hybrid Policies, Academic Computer Security Policy: General University Policies, Information Risk Management, Risk Mitigation, Risk Handling Strategies and Risk Assessment, Information Classification – Guidelines, Types, Criteria for data Classification, Data Classification procedures, Classification Controls.	15	CO3
4	**Authentication:** Basics of Authentication, One Factor Authentication, Two Factor Authentication, Multi Factor Authentication, Passwords: Attacking a Password System, Countering Password Guessing, Biometrics: Fingerprints, Faces, Voices, Eyes and Combinations, Access Control, Types of Access Control.	15	CO4

Suggested Readings

1. Matt Bishop, "Introduction to Computer Security", Addition Wesley.
2. William Stallings, "Computer Security: Principles and Practices", Pearson Education.

3. Timothy Morey Andrew Burt, Thomas C. Redman, Christine Moorman "Customer Data and Privacy: The Insights You Need from Harvard Business", Harward Business Press.

Online Resources

1. https://archive.nptel.ac.in/courses/106/106/106106146/

Course Articulation Matrix														
PO-PSO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	1	1	1		1	1		1			1		1
CO2	1	2	1	1	1	1			1			1	1	2
CO3		1	2	2		1	1		1	1	1	1		1
CO4	2	2	3	2	2	2	1		3	2	3	2	2	3

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	Essential Of Data Collection Ethics				
Code	BCADS13212				
Course Type	GE	L	T	P	Credit
Pre-Requisite		3	1	0	4
Course Objectives	To provide participants with the adequate knowledge of the techniques of data collection and ethics.				
Course Outcomes					
CO1	To understand the basic concept of data collection and their methods.				
CO2	To understand the principle of data collection ethics.				
CO3	To understand the essential of data collection ethics.				
CO4	To understand the case studies of data collection ethics.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	**Fundamentals of data collection:** Definition and concept Data collection, Data collection method, type of data collection method; **Primary data collection method**: Quanative method-Time series analysis, Smoothing technique, Barometric method, Qualitative method-survey, Interviews, Group, questionnaire; **Secondary data collection method:** Internal sources of data collection, External sources of data collection.	15	CO1
2	**Data collection ethics**: 5C's of data collection ethics, Consent, Clarity, Consistency, Control, Consequences; **Principle of data collection ethics**: Privacy, Consent, Transparency, Fairness, Accountability.	15	CO2
3	**Data collection ethics:** Introduction of data collection ethics, Ethical frameworks, Informed consent, Privacy and Confidentiality, Bias and Fairness, Responsible data handling, Ethics issue in specific context.	15	CO3
4	**Case Studies:** Facebook Emotional Contagion Study, Tuskegee Syphilis Study, Cambridge Analytical Data Scandal, Google Street WIFI Data Collection, Online Survey Consent.	15	CO4

Suggested Readings

1. Data Collection: Methods, Ethical Issues and Future Directions by Susan Elswick, Nova Science Pub Inc.
2. Data Science Ethics: Concepts Techniques and Cautionary Tales by David Martens, Oxford University Press.
3. Ethics of Data and Analytics Concepts and Cases by Kirsten Martin, Auerbach Publications (T&F).

Online Resources

1. https://www.simplilearn.com/what-is-data-collection-article
2. https://searchworks.stanford.edu/view/13045465

							Course Articulation Matrix							
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2		2	1	1		1			2	1	1
CO2	2		2		2	2	1		1			2	1	1
CO3	2	2	2	2	3	2	2		2	2	2	2	2	2
CO4	2	2	3	2	2	2	2		3	2	2	2	3	3

Program	Bachelor of Computer Applications (DS & AI)				
Year	II	**Semester**		III	
Course Name	Linux Lab				
Code	BCADSN13251				
Course Type	DSC	**L**	**T**	**P**	**Credit**
Pre-Requisite		0	0	4	2
Course Objectives	To provide the fundamental knowledge about LINUX operating system, its diverse commands related to file handling, disk, process utilities, redirection etc. Also familiarize the students to do shell programming using vi editor.				
Course Outcomes					
CO1	To demonstrate the basic knowledge of Linux commands and file handling utilities by using Linux shell environment.				
CO2	To introduce shell scripting for various applications.				

Module	Course Contents	Contact Hrs.	Mapped CO

1	1. Use of Basic LINUX Commands: PATH, man, echo,who passwd, uname, date, stty, pwd, cd,mkdir, rmdir, cat,ls, cp, mv, rm, , more, wc
	2. Commands related to Input Output Redirection
	3. Commands related to File handling and Process utilities
	4. Commands related to Security by file permissions: chmod, umask, stickybit
	5. Commands related to disk utilities-du, df, find & ulimit
	6. Implementation of Filters and Pipes
	7. Using vi editor do the following things:
	   a. Cursor movement
	   b. Text insertion
	   c. Changing and replacing text
	   d. Deleting text
	   e. Searching the text
	   f. Pattern Matching of text
	   g. Various options to :set command
	   h. Compiling and Running a C program
	Note: Student will also perform all other exercises provided by course instructor.
		30	CO1

2	1. Write interactive shell scripts based on following:
	    a. Positional parameters
	    b. Arithmetic and Logical Operators
	    c. If-then-fi, if-then-else-fi, nested if-else, elif, case structure
	    d. While, until and for loop
	    e. Shell Meta characters
	2. Write a Shell script that accepts a filename, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
	3. Write a Shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
	4. Write a Shell script that displays list of all the files in the current directory to which the user has Read, Write and Execute permissions.
	5. Write a Shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. If the argument is a file, the number of lines on it is also reported.
	6. Write a Shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word present in the first argument file on other argument files.
	7. Write a shell program to accept user name and reports if user log has logged in.
	Note: Student will also perform all other exercises provided by course instructor.
		30	CO2

Suggested Readings:

1. Sumitabha Das, "Unix Concepts and Applications", TMH
2. Yashwant Kanetkar, "Unix Shell Programming", BPB
3. Parata, "Advanced Unix–A Programmer's Guide", BPB
4. Behrouz A. Forouzan, Richard F. Gilberg, "Unix and shell Programming", Thomson Asia
5. M.G. Venkateshmurthy, "Unix & Shell Programming", Pearson Education

Online Resources:
1. http://www.nptel.com/computerscience/Linuxprogramming
2. http://manuals.bioinformatics.ucr.edu/home/linux-basics

Course Articulation Matrix													
PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	1	1	2	1		1			2	1	1
CO2	2		2	2	2	2	1		1			2	1	1

Program	Bachelor of Computer Applications (DS & AI)				
Year	II		Semester	III	
Course Name	Programming with Java Lab				
Code	BCADSN13252				
Course Type	DSC	L	T	P	Credit
Pre-Requisite		0	0	4	2
Course Objectives	To implement the basic concepts of object-oriented using classes and objects, inheritance, interface, packages, exception handling techniques and multithreading and to design streams and efficient user interface design techniques using GUI.				
Course Outcomes					
CO1	Able to use the syntax and semantics of java programming language and basic concepts of OOP using the concepts of inheritance, polymorphism, interfaces and packages.				
CO2	Able to apply the concepts of Multithreading and Exception handling to develop efficient and error free codes and to design event driven GUI and web related applications which mimic the real word scenarios.				

Module	Course Contents	Contact Hrs.	Mapped CO
1	1. Implementation of a simple Java Program, Interpreting & Compiling. 2. Implementation of control, such as Loops etc. 3. Implementation of Single and Multidimensional Array. 4. Implementation of String class and String Operations. 5. Implementation of Classes and Objects. 6. Implementation of Method in Java. 7. Implementation of Constructor overloading. 8. Implementation of Access Modifier. 9. Implementation of static and this keyword. Note: - Students will also perform all other exercises provided by course instructor.	30	CO1
2	1. Implementation of Inheritance in Java 2. Implementation of Super Keyword. 3. Implementation of Abstract class and final Keyword. 4. Defining and Importing Packages. 5. Defining and Implementing Interface. 6. Implementation of I/O Stream. 7. Implementation of Exception Handling 8. Handling of Multiple Threads. 9. Implementation of AWT Control. 10. Implementation of Event Handling. Note: - Students will also perform all other exercises provided by course instructor.	30	CO2

Suggested Readings

1. Herbert Schild, "The Complete Reference, Java 2", TMH.
2. R Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers.
3. E. Balaguruswamy, "Programming with Java A Primer", TMH.

Online Resources

1. https://archive.nptel.ac.in/courses/106/105/106105191/

PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Course Articulation Matrix														
CO1	2	1			2	1	1					1	2	1
CO2	2	2	1	1	2	1	2		2	2	1	3	2	2