COVER PAGE

Information Retrieval Systems (CS141)

IV B. Tech: II Sem

L: 3 T: 0 P: 0 C: 3

Name of the Instructor(s): Dr.K. Seena Naik, Mr. Rajesh Mothe

No. of Hours/week: 3

Total number of hours planned: 48

Pre-requisite

- Probability and Statistics
- Data Mining

Learning Resources

Course notes, Text books, Course sites.

Required Resources

Text Books:

- 1. Kowalski, Gerald, Mark T Maybury, "Information Retrieval Systems: Theory and Implementation", Kluwer Academic Press, 2006.
- 2. Robert Korfhage," Modern Information Retrival" Yates Pearson Education Information Storage & Retrieval, John Wiley & Sons, 1997.

Reference Books:

- 1. Frakes, W.B., Ricardo Baeza-Yates: "Information Retrieval Data Structures and Algorithms", Prentice Hall, 1992.
- 2. Gobinda B chowdhury "Information to Modern Information Retrieval" Library accusation publication

Web Links:

- 1. frakes.cs.vt.edu/frakespubs.html
- 2. books.google.co.in > Computers > Database Management > General

Reading materials:

- 1. Course Material
- 2. Online Video links.

How to Contact Instructor:

- In-person office hours:
 - 1. Dr.K. Seena Naik
 - In-person office hours: 3pm-4pm at Staff Room-III (Room No.-1313)
 - Online office hours: 5pm-10pm through WhatsApp groups
 - ✓ Email address:seena_naik@srecwarangal.ac.in
 - ✓ Phone numbers: +91-9014995456 only for text messages
 - 2. Mr. Rajesh Mothe
 - In-person office hours: 3pm-4pm at Staff Room-III (Room No.-1313)

- Online office hours: 5pm-10pm through WhatsApp groups
 ✓ Email address: mraj1210@gmail.com and rajesh_m@srecwarangal.ac.in
- Phone numbers: +91-9701775352 only for text messages

Technology Requirements: (optional)

- Laptops for class work
- Learning management system like Google classroom

Overview of Course:

• What is the course about: its purpose?

Information Retrieval system is a part and parcel of communication system. The main objectives of Information retrieval is to supply right information, to the hand of right user at a right time. Various materials and methods are used for retrieving our desired information.

- What are the general topics or focus?
 - 1. Information Retrieval System Capabilities.
 - 2. Cataloging and Indexing.
 - 3. Automatic Indexing.
 - 4. Document and Term Clustering.
 - 5. User Search Techniques.
 - 6. Text Search Algorithms.
- Why would students want to take this course and learn this material?
 - 1. To get the kknowledge of Fundamentals of Information Retrieval Systems
 - 2. To ccomprehend the Capabilities of IRS.
 - 3. To aanalyse skills on indexing structure.
 - 4. To ssynthesize the different types of data structures.
 - 5. To develop knowledge on Text Retrieval Systems

Methods of instruction

- Lecture (chalk & talk / PPT)
- Collaborative Learning (Think pair share / Jigsaw/ Brainstorm)

Workload

- Estimated amount of time student needs to spend on course readings : 1-2 hours per week
- Estimate amount of time to student needs to spend on course assignments and projects:2-3 hours per week.

Assessment

S. No	Assessments	Assessment Methodology	No of assessments	Weightage in marks	Marks scaled to
1		Quizzes	2	5	5
2		Class test	2	10	5
3	CIE	Assignment			
4	CIE	Course Activity			
5		Course Project			
6		Internal exams	2	20	20
7	SEE				70

Note:

- Class test/ Quiz 1. last week of December (Quize-1)
 - 2. Third week of January (Class Test-1)
 - 3. Second week of February (Quize-2)
 - 4. Second week of March (Class Test-2)
- Grades will be shared within 3 days from the activity.
- Quizzes are having10 Questions each carry equal marks for a total of 5 marks.
- Class Test is having 4 Questions each carry equal marks for a total of 10 marks to be scaled to 5 marks.
- Absentees for class assessments: In case the student is absent then an open-ended problem will be given as an assignment with a deadline, in case the assignment is not submitted in time then he/she will give zero marks.

Key concepts:

- 1. Information Retrieval System Capabilities.
- 2. Cataloging and Indexing.
- 3. Automatic Indexing.
- 4. Document and Term Clustering.
- 5. User Search Techniques.
- 6. Text Search Algorithms.

LESSON PLAN

Course Outcomes (COs):

At the end of the course the student should be able to:

- 1. Comprehend and apply the basic concepts of information retrieval.
- 2. Accomplish the data structure and automatic indexing for the hypertext.
- 3. Applying searching procedure for user-text, designs and implement the system.
- 4. Synthesize programs to implement search engines.
- 5. Develop skills in problem solving using systematic approaches and analyse the limitations of different information retrieval techniques.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	2				2			1					2	
CO2	3				2	1			2			2		
CO3		3			2			1						1
CO4			2				3			1				
CO5	2			1							3			

Course Content:

UNIT – I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

UNIT – II

Information Retrieval System Capabilities: Search, Browse, Miscellaneous Cataloging **and Indexing:** Objectives, Indexing Process, Automatic Indexing, Information Extraction.

UNIT –III

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure. **Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT – IV

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies

UNIT – V

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results

Lecture No.	Торіс	Delivery Method/ Activity
Unit-I		
L1	IRS Introduction: Definition	Chalk and Talk/ Brainstorm
L2	Objectives	Chalk and Talk
L3	Functional Overview	Chalk and Talk
L4	Relationship to DBMS	Chalk and Talk
L5	Digital libraries and Data Warehouses	PPT
Unit-II		
L6	Information Retrieval System Capabilities	Discussion/ Think Pair share
L7	Search	
L8	Browse and Miscellaneous	Chalk and Talk
L9	Quize-1 from Lecture 1 to Lecture 8	
L10	Cataloging and Indexing	PPT/ Brainstorm
L11	Objectives	Chalk and Talk
L12	Indexing Process	Chalk and Talk
L13	Automatic Indexing	PPT/ Jigsaw
L14	Information Extraction	Discussion
Unit-III		
L15	Data Structures: Introduction	Chalk and Talk
L16	Stemming Algorithms	Brainstorm
L17	Inverted file structures	Chalk and Talk
L18	N-gram data structure	Chalk and Talk
L19	PAT data structure, Signature file structure	Chalk and Talk
L20	Hypertext data structure	PPT

L21	Class Test-1 from Lecture 10 to Lecture 20	
II – Mid	Examinations	
L22	Automatic Indexing: Classes of automatic indexing	Chalk and Talk
L23	Statistical indexing	Chalk and Talk
L24	Natural language	Chalk and Talk/ Brainstorm
L25	Concept indexing	Chalk and Talk
L26	Hypertext linkages	Chalk and Talk
Unit-IV		L
L27	Document and Term Clustering: Introduction	Chalk and Talk
L28	Thesaurus generation	PPT
L29	Item clustering	Discussion/ Think Pair Share
L30	Hierarchy of clusters	Chalk and Talk
L31	Quize-2 from Lecture 22 to Lecture 30	
L32	User Search Techniques: Search statements and binding	PPT/ Brainstorm
L33	Similarity measures and ranking	Chalk and Talk
L34	Relevance feedback	Chalk and Talk
L35	Selective dissemination of information search	Chalk and Talk
L36	Weighted searches of Boolean systems	PPT
L37	Searching the Internet and hypertext	Discussion/ Jigsaw
L38	Information Visualization: Introduction	Chalk and Talk
L39	Cognition and perception	Brainstorm
L40	Information visualization technologies	Chalk and Talk
Unit-V		
L41	Text Search Algorithms: Introduction	Chalk and Talk
L42	Software text search algorithms	Chalk and Talk
L43	Hardware text search systems	PPT
L44	Information System Evaluation: Introduction	Discussion
L45	Measures used in system evaluation	Chalk and Talk
L46	Measurement example – TREC results	Discussion/ Think Pair Share

L47	Discussion on IRS Latest updates	Discussion				
L48	Class Test-2 from Lecture 32 to Lecture 46					
II – Mid Examinations						

COVER PAGE

CYBER LAWS (OE115)

IV B.Tech: II Sem

L: 3 T: 0 P: 0 C: 3

Name of the Instructor(s):

1. Dr. D. Kothandaraman

2. J. Bhavana

No. of Hours/week: 3 hours per week

Total number of hours planned: 48

Pre-requisite

- Basic knowledge about internet crimes
- Cyber issues related to the internet, communication technology, and electronic elements including hardware, software, computer and information systems.
- Legal and illegal issues related to the internet crimes.

Learning Resources

1. Lecture Notes

Required Resources:

Textbook:

1. Harish Chander, "Cyber Laws and IT Protection", PHI, 2012.

References book:

1. George Kostopoulos, "Cyberspace and Cyber Security", Auerbach Publications, 2012.

2. Albert Marcella, Jr., Doug Menendez, "Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes", Auerbach Publications, 2nd Edition, 2007.

Reading materials:

1. Lecture notes soft copy will be provided to the students.

2. Online video links will be provided.

Additional Resources:

https://www.itlaw.in/ http://ili.ac.in/e-learnCL.htm

How to Contact Instructor:

- In-person office hours:
 - 1. Students can able to meet, whenever we have free schedule during the college hours.
 - 2. Students can able to meet 3:00 pm to 4:00 pm in college working hours.
- Online office hours: time and how to access

- Email address: <u>kothanda_raman_d@srecwarangal.ac.in</u> and <u>bhavana_j@srecwarangal.ac.in</u>
- o Phone numbers: 9944380724, 9866918803
- LMS: 7 pm to 10pm

Technology Requirements:

Google classroom

Overview of Course:

• What is the course about: its purpose?

A cyber law plays a vital role in all electronic contents in internet. Cyber-law is created to help protect people and organizations on the internet from malicious people on the internet and help to maintain order. If someone breaks a cyber-law or rule, it allows another person or organization to take action against that person or have them sentenced to a punishment.

• What are the general topics or focus?

- 1. Scope of cyber laws
- 2. Online resources related to cyber laws
- 3. Security information's
- 4. Regulation of cyber crimes
- 5. Types of E-commerce
- 6. IPR Issues
- How does it fit with other courses in the department or on campus? Cyber laws course common to all branches.
- Why would students want to take this course and learn this material? In future all electronic contents are processing in internet. So that everyone should aware about the cyber-crime related to the personal and office data's.

Methods of instruction

- Lecture
- Group Discussion
- Team based learning

Workload

- Estimated amount of time student needs to spend on course readings: **1 hour per week**
- Estimate amount of time to student needs to spend on course assignments and projects: 1 hour per week

Assessment

S. No	Assessments	Assessment Methodology	No of assessments	Weightage in marks	Marks scaled to
		Quizzes			
		Class test			
	CIE	Assignment	2	2.5	5
	CIE	Course Activity	2	2.5	5
		Course Project			
		Internal exams	2	10	20
	SEE				70

Assessments:

Two types of assessments: 1. Assignments 2. Activities

1. Assignment:

1.1. Assignment: Schedule: Before the I-Internal Examination Syllabus: I-Unit, II-Unit and III-Unit.

1. 2. Assignment:

Schedule: Before the II-Internal Examination Syllabus: IV-Unit, V-Unit.

Note: If the students submit the assignment in time then, will be given with 2.5 marks, otherwise 0 marks

2. Activities:

2. 1. Activity:

Topic: Analyze in details about different role of electronic signatures **Activity:** Think Pair Share **Description of the Activity:** Each team has to analyses the role of electronic signature.

Rubrics:

H.T.No	Identify the	Identify	Total Marks
	electronic	different	(2.5m)
	signature(1m)	electronic	
		evidence (1.5m)	

2. 2. Activity:

Topic: Offences under the Cyberspace law and the Internet in India **Activity:** Think Pair Share

Description of the Activity: Each team has to write important offences under the cyberspace laws in internet in india.

Rubrics:

H.T.No	Identify the important offences (1m)	What are the offences under cyber laws and the internet in	Total Marks (2.5m)
		india (1.5m)	

Note: If done the activity 2.5 marks, otherwise 0 marks

Key concepts

- Introduction to Computer Technology and Programming.
- Legal Dimensions of IPR in Cyber World.
- Fundamentals of Information Security.
- E-Business Security.
- Communication and Soft Skills.
- IT Acts and Cyber Crime.
- OS: Linux, Server (Apache)
- IT Act, Information assurance & e-Governance/ Data Information & Cryptography.

LESSON PLAN

Course Outcomes (COs):

At the end of the course the student should be able to:

- 1. Analyze and evaluate the current trends and technologies such as e-commerce and e-governance.
- 2. Sketch the importance of digital signature in electronic records.
- 3. Formulate the importance and role of cyberspace laws and cyber-crimes.
- 4. Design and motivate law relating to electronic records and intellectual property rights in India.
- 5. Summarize about the IT act in India and generate the new IT acts for current cyber space.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	3	3								1		1	3	3
CO2	3	3	3	2									3	3
CO3	3	2	2	2					1				3	2
CO4	3	3	2	2									3	2
CO5	3	2	2	2					1				3	2

Course Content (Syllabus)

Content	Hrs			
Unit - 1				
Internet, E-Commerce and E-Governance with reference to Free Market Economy: Understanding Computers, Internet and Cyber laws, Conceptual Framework of E-commerce: E-Governance, the role of Electronic Signatures in E- commerce with Reference to Free Market Economy in India.	10.00 hrs			
Unit - 2				
Law Relating to Electronic Records and Intellectual Property Rights in India: Legal aspects of Electronic records / Digital signatures, The roles and regulations of Certifying Authorities in India, Protection of Intellectual Property Rights in Cyberspace in India	10.00 hrs			
Unit - 3				
International Efforts Relating to Cyberspace Laws and Cyber Crimes: International efforts related to Cyber laws, Council of Europe (COE) convention on Cyber Crimes.	10.00 hrs			
Unit - 4				
Penalties, Compensation and Offences Under the Cyberspace and Internet in India: Penalties, Compensation and Adjunction of violations of provisions of IT Act and Judicial review, some important offences under the Cyberspace law and the Internet in India, Other offences under the Information Technology Act in India.	10.00 hrs			
Unit - 5				
Miscellaneous Provisions of IT Act and Conclusions: The role of Electronic Evidence and miscellaneous provisions of the IT Act.	08.00 hrs			

Lecture No.	Торіс	Delivery Method/ Activity
UNIT – I I	nternet, E-Commerce and E-Governance with reference	e to Free Market
	Economy:	
L1	Introduction	Chalk and Talk
L2	Chalk and Talk	Chalk and Talk
L3,L4	Internet and Cyber laws	Chalk and Talk
L5,L6	Conceptual Framework of E-commerce	PPTs
L7,L8	E-Governance	PPTs

L9	Role of Electronic Signatures	Think Pair Share
	(2.1 Activity)	
L10	E-commerce with Reference to Free Indian Market	PPTs
UNIT – II La	erty Rights in India	
L11	Introduction	PPTs
L12	Legal aspects of Electronic records	PPTs
L13	Digital signatures	Think Pair Share
L14	The roles and regulations of Certifying Authorities in India	PPTs
L15,L16	Protection of Intellectual Property Rights in Cyberspace in India	PPTs
	(1. 1. Assignment)	
UNIT – III Inte	ernational Efforts Relating to Cyberspace Laws and Cy	ber Crimes:
L17	Introduction	Chalk and Talk
L18,L19	International efforts related to Cyber laws	PPTs
L20	Council of Europe (COE) convention on Cyber Crimes	PPTs
UNIT – IV Pena	alties, Compensation and Offences Under the	
Cyberspace and	l Internet	
L21	Penalties	Chalk and Talk
	(1.2. Assignment)	
L22,L23	Compensation and Adjunction of violations of provisions of IT Act and Judicial Review	PPTs
L24,L25	Some important offences under the Cyberspace law and the Internet in India (2.2. Activity)	Think Pair Share
L25,L26	PPTs	
UNIT-V - Misc	cellaneous Provisions of IT Act and Conclusions	
L26,L27,L28	The role of Electronic Evidence	Team-based learning
L29,L30	Miscellaneous provisions of the IT Act	PPTs

COVER PAGE

Big Data Analytics (CS138)

IV B. Tech: II Sem

L: 3 T: 0 P: 0 C: 3

Name of the Instructor(s): Dr. R. Vijaya Prakash, Mr. Rajesh Mothe

No. of Hours/week: 3

Total number of hours planned: 48

Pre-requisite:

• Data Warehousing and Data Mining

Learning Resources:

Course notes, Text books, Course sites.

Required Resources:

Text Books:

- 1. Seema Acharya & amp; Subhashini Chellappan "Big data and Analytics" Wiley India Publishers, 2011.
- 2. Tom White "Hadoop the definitive guide" O'Reilly Publishers, 2015

Reference Books:

- 1. Eric Sammer, "Hadoop Operations", O'Relley, 2012.
- 2. Vignesh Prajapati, Big data analytics with R and Hadoop, SPD 2013.

Web Links:

- 1. http://hadoop.apache.org
- 2. www.cloudera.com
- 3. <u>http://hortonworks.com</u>
- 4. <u>http://www.edureka.com</u>

Reading materials:

- 1. Course Material
- 2. Online Video links.

How to Contact Instructor:

- In-person office hours:
 - 1. Dr. Vijaya Prakash
 - In-person office hours: 3pm-4pm at Staff Room-I
 - Online office hours: 5pm-10pm through WhatsApp groups

- ✓ Email address:<u>vijaya_prakash_r@srecwarangal.ac.in</u>
- ✓ Phone numbers: +91-9951332996 only for text messages
- 2. Mr. Rajesh Mothe
 - In-person office hours: 3pm-4pm at Staff Room-III (Room No.-1313)
 - Online office hours: 5pm-10pm through WhatsApp groups
 - ✓ Email address: <u>mraj1210@gmail.com</u> and <u>rajesh_m@srecwarangal.ac.in</u>
 - ✓ Phone numbers: +91-9701775352 only for text messages

Technology Requirements: (optional)

- Laptops for class work
- Software's Hadoop, Pig, HIVE, HBase, Zookeeper
- Learning management system like Google classroom.

Overview of Course:

• What is the course about: its purpose?

Big data analytics is the often-complex process of examining large and varied data sets, or big data, to uncover information -- such as hidden patterns, unknown correlations, market trends and customer preferences -- that can help organizations make informed business decisions.

- What are the general topics or focus?
- 1. Types of Digital Data.
- 2. Big Data
- 3. Hadoop
- 4. HDFS Architecture
- 5. Hive
- 6. Pig Latin Programming
- 7. HBase
- Why would students want to take this course and learn this material?
 - 1. To understand the 5V's paradigm of big data and categorizing digital data.
 - 2. To apply analytics to gain insights into the big data.
 - 3. To comprehend the Hadoop architecture for storage and processing the big data.
 - 4. To explore NoSQL databases and differentiating from SQL.
 - 5. To analyse the tools available for big data analytics.

Methods of instruction

- Lecture (chalk & talk / PPT)
- Collaborative Learning (Think pair share / Jigsaw / Brainstorming)

Workload

- Estimated amount of time student needs to spend on course readings: 2-3 hours per week
- Estimate amount of time to student needs to spend on course assignments and projects:3-4 hours per week.

Assessment

S. No	Assessments	Assessment Methodology	No of assessments	Weightage in marks	Marks scaled to
1		Quizzes	2	5	5
2		Class test	2	10	5
3	CIE	Assignment			
4	CIE	Course Activity			
5		Course Project			
6		Internal exams	2	20	20
7	SEE				70

Note:

- Class test/ Quiz 1. last week of December (Quize-1)
 - 2. Third week of January (Class Test-1)
 - 3. Second week of February (Quize-2)
 - 4. Second week of March (Class Test-2)
- Grades will be shared within 3 days from the activity.
- Quizzes are having10 Questions each carry equal marks for a total of 5 marks.
- Class Test is having 4 Questions each carry equal marks for a total of 10 marks to be scaled to 5 marks.
- Absentees for class assessments: In case the student is absent then an open-ended problem will be given as an assignment with a deadline, in case the assignment is not submitted in time then he/she will give zero marks.

Key concepts:

- 1. Types of Digital Data.
- 2. Big Data
- 3. Hadoop
- 4. HDFS Architecture
- 5. Hive
- 6. Pig Latin Programming
- 7. HBase

LESSON PLAN

Course Outcomes (COs):

At the end of the course the student should be able to:

- 1. Classify various data analytics.
- 2. Distinguish hdfs operations for different applications.
- 3. Implement map reduce application for various data.
- 4. Relate various programming constructs with respect to big data.
- 5. Demonstrate Hadoop ecosystem for data analytics.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	2	2											2	
CO2	2	2	3	2	3	1						2		2
CO3	2	2	3	3	3	1								3
CO4		2	3	2										2
CO5			2	3										2

Course Content (Syllabus)

UNIT – I

Types of digital data: Structured, Semi-structured and Un-structured. Big data definition: volume, velocity, variety, veracity and value. Big data analytics skills: analytics classification, In-memory analytics, parallel processing and distributed systems. CAP theorem. The big data technology landscape: Sql and NoSql. Introduction to Hadoop.

UNIT – II

Exploring Hadoop architecture: HDFS: The hadoop distributed file system. Basic concepts, namenode, datanode, The design of HDFS, Interfaces Basic commands for file system operations, Hadoop I/O.

UNIT –III

Introduction to MapReduce programming: Mapper, Reducer, Combiner, Partitioner, Searching, Sortitng, Compression. Developing a MapReduce application (programming language is not binding), MapReduce workflows, MapReduce Types & Formats, Features of MapReduce.

$\mathbf{UNIT} - \mathbf{IV}$

Introduction to HIVE: Architecture, File Format, Hive Query Language (HQL). Programming with Hive.

Introduction to Pig: Pig Latin Overview, data types, Running Pig, Execution models, Pig Commands, Application development using Pig. Pig vs Hive.

UNIT – V

Introduction to HBase: NoSQL a column-oriented database. Example schemas & comparisons with RDBMS. Introduction to Zookeeper: Installing & running zookeeper. Zookeeper service. Introduction to Sqoop: A sample import using Sqoop. Importing large objects. Working with imported data. A deeper look at Sqoop export.

Lecture No.	Торіс	Delivery Method/ Activity					
Unit-I							
L1	Introduction	Brainstorm					
L2	Types of digital data: Structured, Semi-structured and Un- structured.	Chalk and Talk					
L3	Big data definition: volume, velocity, variety, veracity and value	Chalk and Talk					
L4	Big data analytics skills: analytics classification	Chalk and Talk					
L5	In-memory analytics	Chalk and Talk					
L6	parallel processing and distributed systems	PPT					
L7	CAP theorem	Discussion					
L8	The big data technology landscape: Sql and NoSql	Chalk and Talk					
L9	Introduction to Hadoop	Brainstorm					
Unit-II							
L10	Exploring Hadoop architecture	Chalk and Talk					
L11	L11 Quize-1 from Lecture 1 to Lecture 10						
L12	HDFS: The hadoop distributed file system	Chalk and Talk					
L13	Basic concepts	Chalk and Talk					
L14	Name node	Chalk and Talk					
L15	Data node	Chalk and Talk					
L16	The design of HDFS	PPT					
L17	Interfaces	Chalk and Talk					
L18	Basic commands for file system operations	Discussion					
L19	Hadoop I/O	Chalk and Talk					
Unit-III							
L20	Introduction to MapReduce programming	Brainstorm					

L21	Mapper, Reducer, Combiner	Chalk and Talk					
L22	Partitioner, Searching, Sortitng, Compression	Chalk and Talk					
L23 Class Test-1 from Lecture 12 to Lecture 22							
I – Mid Examinations							
L24	Developing a MapReduce application	Chalk and Talk					
L25	MapReduce workflows	PPT					
L26	MapReduce Types & Formats	Discussion					
L27	Features of MapReduce	Chalk and Talk					
Unit-IV							
L28	Introduction to HIVE, Architecture	Brainstorm					
L29	File Format	Chalk and Talk					
L30	Hive Query Language (HQL)	Chalk and Talk					
L31	Programming with Hive	Chalk and Talk					
L32	Quize-2 from Lecture 24 to Lecture 31						
L33	Introduction to Pig, Pig Latin Overview	Chalk and Talk					
L34	data types	Discussion					
L35	Running Pig	Chalk and Talk					
L36	Execution models	Brainstorm					
L37	Pig Commands	Chalk and Talk					
L38	Application development using Pig	Chalk and Talk					
L39	Pig vs Hive	Chalk and Talk					
	Unit-V						
L40	Introduction to HBase	Chalk and Talk					
L41	NoSQL a column-oriented database	Brainstorm					
L42	Example schemas & comparisons with RDBMS	Chalk and Talk					
L43	Introduction to Zookeeper, Installing & running zookeeper	Chalk and Talk					
L44	Zookeeper service	Chalk and Talk					
L45	Introduction to Sqoop, A sample import using Sqoop	РРТ					
L46	Importing large objects, Working with imported data	Chalk and Talk					

L47	A deeper look at Sqoop export	Chalk and Talk					
L48Class Test-2 from Lecture 33 to Lecture 47							
II – Mid Examinations							