

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Data Mining and Warehousing	BCA-501	L	T	J	EST	CAT	Total
		3	1	0	70	30	100

Course Objective This course will introduce the concepts of data ware house and data mining, which gives a complete description about the principles, used, architectures, applications, design and implementation of data mining and data ware housing concepts

Units	Contents (Theory)	Hours /week
I	Data Warehousing: History of Data Warehouses; Concepts; Benefits; Comparison of OLTP and Data Warehousing, Data Marts.	8
II	Principles of Dimensional Modeling: Objectives; Requirements to Data Design; STAR Schema: concept of Keys, Advantages. Dimensional Modeling: Updates to the Dimension tables; miscellaneous dimensions; SNOWFLAKE schema; Aggregate fact tables; Families of STARS..	8
III	Data Warehousing Architecture: Data: Operational, Store, Detailed, Lightly and Highly summarized, Metadata; Archive/Backup; Manager: Load, Warehouse, Query; Architecture models: 2,Tier, 3,Tier and 4,Tier .	8
IV	OLAP: Definitions, Rules, Characteristics, Features and functions, Dimensional analysis; Hypercube; Drill, Down and Rollup; Slice, and, Dice or Rotation; OLAP Models.	8
V	Data Mining: Definition; Knowledge discovery process (KDP); OLAP vs. Data mining; Data mining vs. Data warehouse; Major data mining techniques; Cluster detection; Decision trees; Memory based reasoning; Neural networks; Genetic algorithms; Applications; Benefits..	8

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
Pieter Adriaans, Dolf & Zantinge	Data mining	1996	Addison Wesley
Sam Anahory & Dennis Murray	Data Warehousing in real world	1997	Addison Wesley
Paulraj Ponniah	Data Warehousing: Fundamentals for IT Professionals	2012, Second	Wiley India Pvt Ltd.

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

		Edition	
Mark Hall, Ian Witten and Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	2011, Third edition	Morgan Kaufmann Publisher
COURSE OUTCOMES: Students will be able to			
CO1	Understand the functionality of the various data mining and data warehousing components .		
CO2	Have a deeper understanding of database systems and their underlying theory to be able to improve the decision-making process		
CO3	Compare different approaches of data ware housing and data mining with various technologies.		
CO4	To evaluate the different models of OLAP and data preprocessing.		
CO5	To develop ability to design various algorithms based on data mining Tools and describe the designing of Data Warehousing so that it can be able to solve the root problems.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Full Stack Development-Java	BCA-502	L	T	J	EST	CAT	Total
				3	1	0	70

Course Objective	The Objective of this course is to enhance students programming skills and establish a better understanding of the working of AWS, Hibernate, and Spring boot.
-------------------------	--

Units	Contents (Theory)	Hours /week
I	Servlet Servlet basics, API and Life cycle, Steps to create a servlet in server, SevletRequest and Collabration,SevletConfig and ServletContex, Session tracking and filter. JSP basics,API and Life cycle, Scripting elements, Implicit objects, Directive elements, Action elements, MVC, Ajax.	8
II	Hibernate Introduction and architecture, Hibernate IDE integration and Lifecycle, Generator class, Log4j,Hibernate Mapping, HQL, HCQL, Caching	8
III	Spring Dependency Injection, Inversion of Control, autowiring, Spring AOP, AspectJ Annotation and XML, Spring JdbcTemplate, ResultSetExtractor, RowMapper, NamedParameter Spring ORM, Spring with hibernate.	8
IV	Spring MVC Spring MVC, RequestParam, form tag libraries, MVC Validation, MVC CRUD operation , Spring MVC applications and security.	8
V	SpringBoot and REST Springboot architecture, JSON, Spring boot database, caching, Spring boot REST API and spring cloud components.	8

Text Books/ References Book:-

Name of Authors	Titles of the Book	Edition	Name of the Publisher
E-Balagurusamy	Programming In Java	Fourth Edition	Tata McGraw Hill
Michael B. White	Mastering Java	Second Edition	BPB Publications
Ivan Bayross	Advance Java	Second Edition	BPB Publications
Fernando Monteiro	Hands-On Full Stack Web Development with Angular 6 and Laravel 5	First Edition	Packt Publishing Ltd.
Nader Dabit	Full Stack Serverless: Modern Application	First Edition	O'Relly Media

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

	Development with React, AWS, and GraphQL		
COURSE OUTCOMES: Students will be able to			
CO1	Extend their capabilities of servers that host application accessed by means of a request-response programming model.		
CO2	Understand all concepts of Hibernate and know how and when to use parts of the Spring Framework.		
CO3	Use Hibernate with Spring and understand fundamental architectural issues and create efficient object/relational mappings with Hibernate.		
CO4	Develop Java based Web Applications and Restful Micro Services with minimal configuration.		
CO5	The student will develop services through various Url templates, consume and respond with json or XML payloads and create custom HTTP headers.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Theory of Computation	BCA-503	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objectives of this course are to learn types of grammars and models of automata and establishing connections among grammars, automata and formal languages.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction to Finite Automata: The central concepts of Automata theory; Deterministic finite automata; Nondeterministic finite automata. Applications of finite automata, Finite automata with Epsilon transitions.						8
II	Finite Automata and Regular Expressions: Applications of Regular Expressions; Regular languages; Proving languages not to be regular languages; Closure properties of regular languages; Decision properties of regular languages; Equivalence and minimization of automata.						8
III	Context-free grammars: Parse trees; Applications; Ambiguity in grammars and Languages. Definition of the Pushdown automata; the languages of a PDA; Equivalence of PDA's and CFG's.						8
IV	Deterministic Pushdown Automata: Normal forms for CFGs; The pumping lemma for CFGs; Closure properties of CFLs.						8
V	The Turing machine: Programming techniques for Turing Machines, Extensions to the basics Turing machines, Turing machines and computers.						8
Text Books/ References Book:-							
Name of Authors		Titles of the Book		Edition		Name of the Publisher	
John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman		Introduction to Automata Theory, Languages and Computation		3rd Edition		Pearson Education, 2011	
John C Martin		Introduction to Languages and Automata Theory		3rd Edition		Tata McGrawHill, 2007	

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Daniel I.A. Cohen	Introduction to Computer Theory	2nd Edition	John Wiley & Sons, 2009
Thomas A. Sudkamp	An Introduction to the Theory of Computer Science, Languages and Machines	3rd Edition	Pearson Education, 2006

COURSE OUTCOMES: Students will be able to

CO1	Interpret the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability Construct the abstract machines including finite automata, pushdown automata, and Turing machines from their associated languages and grammar.
CO2	Make use of pumping lemma to show that a language is not regular / not context-free
CO3	Construct the grammar for any given finite automata, pushdown automata or Turing machines
CO4	Outline the characteristics of P, NP and NP Complete problems
CO 5	Solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Introduction to Artificial Intelligence and Machine learning	BCA-504	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to teach students the basic concepts of machine learning, supervised learning, unsupervised learning, and reinforcement learning						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction to Artificial Intelligence -Definitions, Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Knowledge Inferring systems and Planning, Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement.						8
II	Knowledge Representation and Reasoning :-Knowledge representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, Heuristic Search , Logical systems, Knowledge Based systems, Propositional Logic Constraints, Predicate Logic First Order Logic, Uncertainty and knowledge Reasoning						8
III	Introduction to Machine Learning : Learning systems, real world applications of machine learning, why machine learning, variable types and terminology, function approximation Types of machine learning: Supervised learning, unsupervised learning, reinforcement learning Important concepts of machine learning.						8
IV	Supervised Learning : Linear, Non-linear, Multi-class and Multi-label classification, Decision Trees, Classification and Regression Trees, Regression: Linear Regression, Multiple Linear Regression, Logistic Regression. Neural Networks: Introduction, Perceptron, Multilayer Perceptron, Support vector machines.						8
V	Unsupervised Learning : Principle component analysis, what are principal components, clustering methods, k-means clustering, hierarchical clustering,						8
Text Books/ References Book:-							
Name of Authors	Titles of the Book			Edition	Name of the Publisher		
Tom M. Mitchell	Machine Learning			First edition	McGraw Hill Education		
Elaine Rich and Kevin	“Artificial Intelligence”				Tata McGraw Hill.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Knight			
Dan W. Patterson	“Introduction to Artificial Intelligence and Expert Systems”		Prentice India
M.Sasikumar,S.Ramani	“Rule based Expert System”		Narosa Publishing House
COURSE OUTCOMES: Students will be able to			
CO1	Understand concepts of machine learning.		
CO2	Have Knowledge of supervised, unsupervised and reinforcement learning.		
CO3	Select model and do regularization.		
CO4	Pick any of these tools, and use them correctly (and optimally) in their research fields. Not as a black-box, but with understanding of the inner-workings, being aware of potential issues that may occur.		
CO5	Understand the difference between Supervised and Unsupervised training.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Introduction to Mobile Computing	BCA-505 E-I (1)	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to explain the principles and theories of mobile computing technologies. Also to describe infrastructures and technologies of mobile computing technologies.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction, issues in mobile computing, Characteristics of Mobile Computing, Structure of Mobile Computing, overview of wireless telephony: cellular concept.						8
II	GSM, air-interface, channel structure, CDMA, GPRS. Wireless Networking, Wireless LAN Overview: MAC issues, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP.						8
III	Data management issues, Hoarding techniques, data replication for mobile computers, adaptive clustering for mobile wireless networks, file system.						8
IV	Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment. The Future of Mobile Computing.						8
V	Mobile Adhoc networks (MANETs), Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV)						8

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Text Books/ References Book:-			
Name of Authors	Titles of the Book	Edition	Name of the Publisher
J. Schiller	Mobile Communications	2 nd ed.(2003)	Addison Wesley
Charles Perkins,	Mobile IP. Design Principles and Practices	1998	Addison Wesley.
Charles Perkins	Ad hoc Networking	2008	Addison Wesley
Shambhu Upadhyaya, Abhijit Chaudhury	Mobile Computing	2008	Springer
COURSE OUTCOMES: Students will be able to			
CO 1	Apply the fundamental design paradigms and technologies to mobile computing applications.		
CO2	Describe the possible future of mobile computing technologies and applications.		
CO3	Identify and solve database issues using hoarding techniques		
CO4	Illustrate technical format, addressing and transmission strategies of packets		
CO5	Determine the functionality of MAC, Network layer and Identifying a routing protocol for given Adhoc Networks.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Soft Computing and Applications	BCA-505 E-I (2)	L	T	J	EST	CAT	Total
		3	1	0	70	30	100
Course Objective	The objective of this course is to familiarize with soft computing concepts, introduce and use the idea of Neural networks, fuzzy logic, genetic algorithm and use of heuristics based on human experience.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Artificial Neural Networks: Basic-concepts-single layer perception-Multi layer perception-Supervised and unsupervised learning back propagation networks, Application.						8
II	Supervised Learning: Introduction and how brain works, Neuron as a simple computing element, The perceptron, Backpropagation networks: architecture, multilayer perceptron, backpropagation learning-input layer, accelerated learning in multilayer perceptron, The Hopfield network, Bidirectional associative memories (BAM),RBF Neural Network.						8
III	Fuzzy sets and Fuzzy reasoning: Fuzzy matrices-Fuzzy functions-decomposition-Fuzzy automata and languages- Fuzzy control methods-Fuzzy decision making, Applications.						8
IV	Neuro-Fuzzy Modeling: Adaptive networks based Fuzzy interfaces-Classification and Representation trees-Data dustemp algorithm –Rule base structure identification-Neuro-Fuzzy controls						8
V	Genetic Algorithm: Survival of the fittest-pictures computations-cross over mutation-reproduction-rank method-rank space method, Application.						8
Text Books/ References Book:-							
Name of Authors		Titles of the Book		Edition		Name of the Publisher	
S. N. Sivanandan and S. N. Deepa		Principles of Soft Computing		2nd Ed, 2011		Wiley India	
B K Tripathy, J. Anuradha		Soft computing Advances and Applications				Cengage Learning	
B Yegnanarayana, Prentice		Artificial Neural Network,		2012		Hall of India Pvt.Ltd ,	

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

R. Rajasekaran and G. A and Vijayalakshmi Pa	, Neural Networks, Fuzzy Logic, and Genetic Algorithms: Synthesis and Applications	Prentice Hall of India
COURSE OUTCOMES: Students will be able to		
CO1	Identify and describe soft computing techniques and their roles in building intelligent machines	
CO2	Recognize the feasibility of applying a soft computing methodology for a particular problem	
CO3	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems, genetic algorithms to combinatorial optimization problems and neural networks to pattern classification and regression problems	
CO4	Effectively use modern software tools to solve real problems using a soft computing approach and evaluate various soft computing approaches for a given problem.	
CO5	Use the concepts of Genetic algorithm and its applications to soft computing using some applications.	

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Theory					
		Credit			Marks		
Digital Marketing	BCA-505 E-I (3)	L	T	J	EST	CAT	Total
				3	1	0	70
Course Objective	The objective of the course is to teach digital marketing methods, from a variety of perspectives-as analysts, consumers and entrepreneurs.						
Units	Contents (<i>Theory</i>)						Hours /week
I	Introduction to Digital Marketing: Definition, Principles, Key concept of Digital Marketing, Characteristics, DMI Framework, DMI Quality Scale.						8
II	Search Marketing: SEO Concepts, SEO Process, SEO Google Search Console, Off Page Optimization, On Page Optimization, PPC Concepts, Keyword Selection, Campaign Management, Conversion Tracking, Conversion Metrics, Keyword Research, Targetting, CPA, CTR.						8
III	Email Marketing: Concepts, User Behavior, Scheduling, Email Copy, Email Structure, Email Delivery, Online Data Capture, Off Line data Capture, Segmentation, Email Design, Filtering. Digital Display Advertising: Concepts, Benefits, Challenges, Ad Formats, Ad Features, Ad Display Frequency.						8
IV	Social Media Marketing: Concepts, Goal Priorities, Features, News Feed, Insights, Business Page, Engagement, Setup and Profile, Channels, Tumblr, Blogging.						8
V	Mobile Marketing: Opportunities and Risks, SMS Content, SMS Strategy, Mobile Advertising, Mobile Optimized Website, Mobile Apps, DMI 6 step process of Mobile App, QR Code, Mobile Coupons and Ticketing.						8
Text Books/ References Book:-							
Name of Authors		Titles of the Book			Edition	Name of the Publisher	
Ian Dobson		The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns			1 st ed.	Wiley	
Puneet Singh Bhatia		Fundamentals of Digital Marketing			1 st ed.	Pearson	

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Vandana Ahuja	Digital Marketing	1 st ed.	Oxford Universty Press
COURSE OUTCOMES: Students will be able to			
CO1	Understand the impact of technology on the traditional marketing.		
CO2	Understand how they can use digital marketing to increase sales and grow their business		
CO3	Understand the elements of the digital marketing plan.		
CO4	Understand how to reach your online target market and develop basic digital marketing objectives.		
CO5	Understand market associated risk or law and establish customer engagement.		

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Practical				
		Credit		Marks		
Programming Lab in Machine Learning	BCA-506	P	J	ESP	CAP	Total
		2	-	30	20	50

Contents (Practical) :-

1. Implement water jug problem.
2. Implement TIC TAC TOE Problem.
3. Implement Python basic libraires.
4. The probability that it is Wednesday and that a student is present is 7 %. Since there are 6 school days in a week, the probability that it is Wednesday is 30 %. What is the probability that a student is present given that today is Wednesday? Apply Baye's rule in python to get the result.
5. Extract the data from database using python.
6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text.
8. Implement an algorithm to demonstrate the significance of genetic algorithm.

LNCT UNIVERSITY, BHOPAL

Programme:- BCA

Semester – V

wef: July 2022

Name of Paper	Paper Code	Practical				
		Credit		Marks		
		P	J	ESP	CAP	Total
Minor Project-II / Internship Evaluation-II	BCA-507	-	4	30	20	50

Contents (Practical)

Process: - Project Guide of the project will be allotted by Director/Head of Department. Any related technology can be chosen for development of Project.