Dr. N.G.P.ARTS AND SCIENCE COLLEGE (Autonomous)

REGULATIONS 2019-20 for Post Graduate Programme (Outcome Based Education model with Choice Based Credit System)

M.Sc. Computer Science Degree

(For the students admitted during the academic year 2019-20 and onwards)

Programme:M.Sc. Computer Science

Eligibility:

Candidates for admission to the first year course leading to the Degree of Master of Science (COMPUTER SCIENCE) will be required to possess a pass in B.Sc. Computer Science / B.C.A. /B.Sc. Computer Technology / B.Sc. Information Technology /B.Sc. Information Sciences/B.Sc. Information Systems/ B.Sc. Software Systems/B.Sc. Software Sciences / B.Sc. Applied Sciences (Computer Science/Computer Technology) / B.Sc. Electronics of any University in Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the M.Sc. Computer Science Examination of this College after the programme of study of two academic years.

Programme Objectives:

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

- 1. To embrace future developments and professional relevance in Computer Science.
- 2. To attain agility in advanced programming languages and software building for wide area of applications.



- 3. To explore with applications of Internet Technologies in the related profession with social and ethical responsibilities.
- 4. To handle the current techniques, skills and tools necessary for computing practice.
- 5. To engage in research oriented activities and life-long learning for continuing professional development.



PROGRAMME OUTCOMES:

On the successful completion of the program, the following are the expected outcomes.

PO Number	PO Statement
PO1	The ability to identify and analyze the requirements of Computer Science problems.
PO2	The understanding of professional and ethical responsibility in the field of computer science and to communicate effectively.
PO3	The ability to implement algorithms and paradigms with modern software tools.
PO4	The ability to function effectively on multi-disciplinary projects and problems.
PO5	The ability to recognize and respond towards research areas of computer science and the need for lifelong learning.



Part	Subjects	SubjectsNo. of Papers			
	Core (Credits 4)	18-22	74	I to IV	
III	Extra Departmental Course (EDC)	1	4	III	
	Discipline Specific Elective (DSE)	3	3 x 4 =12	I to III	
	TOTAL CREDITS		90		

Guidelines for Programmes offering Part I& Part II for Two Semesters:



CURRICULUM

M.Sc COMPUTER SCIENCE PROGRAMME

Course Code	Course	Course Name	т	т	D	Exam	Max Marks		rks	Credita
course cour	Category	Course maine	L		r	(hour)	CIA	ESE	Total	Credits
First Semester				l		1	L			
Part – III			5							
194CS2A1CA	Core – I	Relational Database Management System	4	0	0	3	25	75	100	4
194CS2A1CB	Core - II	Advanced Java Programming	4	0	0	3	25	75	100	4
194CS2A1CC	Core - III	Cloud Computing	4	0	0	3	25	75	100	4
194CS2A1CD	Core - IV	Internet of Things	4	0	0	3	25	75	100	4
194CS2A1CP	Core Practical - I	Relational Database Management System	0	0	5	3	40	60	100	2
194CS2A1CQ	Core Practical – II	Advanced Java Programming	0	0	5	3	40	60	100	2
194CS2A1DA		Advanced Computer Architecture Object								
194CS2A1DB	DSE – I	Oriented Analysis and Design Mobile	4	0	0	3	25	75	100	4
194CS2A1DC		Computing								
Total			20	-	10				700	24

IOM

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M.Sc. CS (Students admitted during the AY 2019-20)

Course Code	Course		T	р	Exam	Exam Max Ma		arks	Cradita	
Course Code	Category	Course Name	L	1	P	(h)	CI A	ESE	Total	Credits
Second Semester										
Part – III										
194CS2A2CA	Core-V	Design and Analysis of Algorithms	4	0	0	3	25	75	100	4
194CS2A2CB	Core - VI	Internet Programmin g	4	0	0	3	25	75	100	4
194CS2A2CC	Core - VII	Network Security	4	0	0	3	25	75	100	4
194CS2A2CP	Core Practical - III	Design and Analysis of Algorithms	0	0	5	3	40	60	100	2
194CS2A2CQ	Core Practical - IV	Internet Programmin g	0	0	5	3	40	60	100	2
194IT2A2EA	EDC	Digital Marketing	4	0	0	3	25	75	100	4
194CS2A2DA		Wireless Networks								
194CS2A2DB	DSE - II	Principles of Programmin g Languages	4	0	0	3	25	75	100	4
194CS2A2DC		Augmented Reality & Virtual Reality								
Total			20	-	10				700	24



Course Code	Course	Course Name	т	т	тр	Exam	Max Marks		:ks	Credits
Course Coue	Category	Course Ivanie	L		L	(h)	CIA	ESE	Total	Cleans
Third Semester										
Part III										
194CS2A3CA	Core - VIII	Open Source Technology	4	0	0	3	25	75	100	4
194CS2A3CB	Core-IX	Big Data Analytics	4	0	0	3	25	75	100	4
194CS2A3CC	Core- X	Software Project Management	4	0	0	3	25	75	100	4
194CS2A3CD	Core-XI	Research Methodology	4	0	0	3	25	75	100	4
194CS2A3CP	Core Practical -V	Open Source Technology	0	0	5	3	40	60	100	2
194CS2A3CQ	Core Practical -VI	Big Data Analytics using R	0	0	5	3	40	60	100	2
194CS2A3DA		Machine Learning								
194CS2A3DB	DSE - III	Soft Computing	4	0	0	3	25	75	100	4
194CS2A3DC		Distributed Operating System								
Total			20	-	10				700	24



Course Code	Course	Course Name	т	тт	т	D	р	D	D	Exam	Ma	ax Ma	rks	Cradita
Course Code	Category	Course Name	L	1	r	(h)	CIA	ESE	Total	Credits				
Fourth Semester														
Part – III														
194CS2A4CA	Core - XII	Android Programming	4	1	0	3	25	75	100	4				
194CS2A4CB	Core - XIII	Web Intelligence	4	0	0	3	25	75	100	4				
194CS2A4CP	Core Practical - VII	Android Programming	0	0	5	3	40	60	100	2				
194CS2A4VA	Core -XIV	Core Project	0	0	16	3	40	60	100	8				
Total 8 1 21							400	18						
Grand Total							2500	90						



DISCIPLINE SPECIFIC ELECTIVE

Students shall select the desired course of their choice in the listed elective course during Semesters I, II&III

Semester I (Elective I)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CS2A1DA	Advanced Computer Architecture
2.	194CS2A1DB	Object Oriented Analysis and Design
3.	194CS2A1DC	Mobile Computing

Semester II (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CS2A2DA	Wireless Networks
2.	194CS2A2DB	Principles of Programming Languages
3.	194CS2A2DC	Augmented Reality & Virtual Reality

Semester III (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CS2A3DA	Machine Learning
2.	194CS2A3DB	Soft Computing
3.	194CS2A3DC	Distributed Operating System



EXTRA CREDIT COURSES

The following are the courses offered under self study to earn extra credits:

S. No.	Course Code	Course Name
1	194CS2ASSA	IPR and Entrepreneurship
2	194CS2ASSB	Organisational Behaviour



Regulation (2019-2020)

PG Programme

Effective from the academic year 2019-20 and applicable to the students admitted to the Degree of Master of Arts/Commerce/Management/Science.

1. NOMENCLATURE

1.1 Faculty: Refers to a group of programmes concerned with a major division of knowledge. Eg. Faculty of Computer Science consists of Programmes like Computer Science, Information Technology, Computer Technology, Computer Applications etc.

1.2 Programme: Refers to the Master of Arts/Management/Commerce/Science Stream that a student has chosen for study.

1.3 Batch: Refers to the starting and completion year of a programme of study. Eg. Batch of 2015–2017 refers to students belonging to a 2-year Degree programme admitted in 2015 and completing in 2017.

1.4 Course: Refers to a component (a paper) of a programme. A course may be designed to involve lectures / tutorials / laboratory work / seminar / project work/ practical training / report writing / Viva voce, etc or a combination of these, to effectively meet the teaching and learning needs and the credits may be assigned suitably.

a) Core Courses

A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

b) Extra Departmental Course (EDC)

A course chosen generally from a related discipline/subject, with an intention to seek exposure in the discipline relating to the core domain of the student.

c) Discipline Specific Elective Course (DSE): DSE courses are the courses offered by the respective disciplinary/ interdisciplinary programme.



d) Project Work:

It is considered as a special course involving application of knowledge in problem solving/analyzing/exploring a real-life situation. The Project work will be given in lieu of a Core paper.

e) Extra credits

Extra credits will be awarded to a student for achievements in co-curricular activities carried out outside the regular class hours. The guidelines for the award of extra credits are given in section two, these credits are not mandatory for completing the programme.

e) Advanced Learner Course (ALC):

ALC is doing work of a higher standard than usual for students at that stage in their education. Research work carried out in University/ Research Institutions/ Industries of repute in India or abroad for a period of 15 to 30 days.

2. EXTRA CREDITS

- Earning extra credit is mandatory. However, it is not essential for programme completion.
- Extra Credits will be awarded to a student for achievement in co-curricular/ extracurricular activities carried other than the regular class-hours.
- A student is permitted to earn a maximum of 10 extra Credits during the programme duration of PG from I to IV Semester.
- Candidate can claim a maximum of 1 credit under each category listed.

The following are the guidelines for the award of Extra credits:

2.1 Proficiency in Foreign Language

Qualification	Credit
A pass in any foreign language in the	
examination conducted by an authorized	1
agency	



2.2 Proficiency in Hindi

Qualification	Credit
A pass in the Hindi examination conducted by	1
Dakshin Bharat Hindi Prachar Sabha	I

Examination passed during the programme period only will be considered for extra credit

2.3 Self-study Course

Qualification	Credit
A pass in the self-study courses offered by the department	1

The candidate should register in the self-study course offered by the department only in the III semester

2.4 Typewriting/Short hand

A Pass in shorthand /typewriting examination conducted by Tamil Nadu Department of Technical Education (TNDTE) and the credit will be awarded.

Qualification	Credit
A pass in the type writing / short hand examination offered by TNDTE	1

2.5 Diploma / Certificate

Courses offered by any recognized University / NCVRT

Qualification	Credit
A pass in any Certificate /Diploma/PG Diploma Course	1



2.6 CA/ICSI/ CMA

Qualification	Credit
Qualifying foundation/Inter level/Final in CA/ICSI/CMA etc.	1

2.7 Sports and Games

The Student can earn extra credit based on their achievement in sports as given below:

Qualification	Credits
Achievement in University/State / National/ International	1

2.8 Online Courses

Pass in any one of the online courses

Qualification	Credit
SWAYAM/NPTEL/Spoken Tutorial etc.,	1

2.9 Publications / Conference Presentations (Oral/ Poster) / Awards

Qualification	Credit
Research Publications in Journals/oral/poster presentation in Conference	1

2.10 Innovation / Incubation / Patent / Sponsored Projects / Consultancy

Qualification	Credit
Development of model/ Products/ Prototype/	
Process/App/Registration of Patents/ Copyrights/	1
Trademarks/Sponsored Projects/Consultancy	



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2.11 Representation

Qualification	Credit
Participation in State / National level celebrations	
such as Independence day, Republic day Parade,	1
National Integration camp etc.,	

3. EXAMINATIONS

The following are the distribution of marks for External and Internal i.e., Comprehensive examination and Continuous Internal Assessment and passing minimum marks for theory papers of PG programmes.

	EXTERNAL			Overall
TOTAL MARKS	Max. marks	Passing Minimum for External alone	Internal Max. marks	Passing Minimum for total marks (Internal + External)
100	75	38	25	50
50	50	25		25

The following are the Distribution of marks for the Continuous Internal Assessment in the theory papers of PG programmes.

S. No.	For Theory- PG courses	Distribution of Marks
1	TESTS I (2 hours)	5
2	TESTS II / End semester Model test (3 hours)	10
3	OBE- Rubrics	10
	TOTAL MARKS	25



The following are the distribution of marks for the External Assessment in PG Theory courses

S. No.	For Theory- PG courses	Distribution of Marks	
1	Comprehensive (Written) Examination	65	50
2	Online MCQ Examination	10	
	TOTAL MARKS	75	50

The following are the distribution of marks for External examinations (CE) and Continuous Internal Assessment (CIA) and passing minimum marks for the practical courses of PG programmes.

	EXTERNAL			Overall
TOTAL MARKS	Max. marks	Passing Minimum for External alone	Internal Max. marks	Passing Minimum for total marks (Internal + External)
100	60	30	40	50
200	120	60	80	100

The following are the distribution of marks for the Continuous Internal Assessment (CIA) in PG practical courses

S. No.	For Theory – PG Practical courses	Distribution of Marks	
1	Tests: Two tests out of which one shall	24	48
	be during the mid semester and the		
	other to be conducted as model test at		
	the end of the semester.)		
2	OBE- Rubrics	16	32
	TOTAL MARKS	40	80

The following are the distribution of marks for the External Assessment in PG practical courses

S. No.	For Theory – PG Practical courses	Distribution of Marks	
1	Experiment-I	25	50
2	Experiment-II	25	50
3	Record & Viva-Voce	10	20
	TOTAL MARKS	60	120



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The following are the distribution of marks for Project and Viva voce examinations/Industrial Training and Continuous Internal Assessments and passing minimum marks for the project courses/Industrial Training of PG programmes

	EXTER	NAL						
TOTAL MARKS	Max. marks	Passing Minimum for External alone	Internal Max. marks	Overall Passing Minimum for total marks (Internal + External)				
100	60	30	40	50				
200	120	60	80	100				

The following are the distribution of marks for the Continuous Internal Assessment in PG Project/ Industrial Training courses.

S. No.	For- PG Project courses/ Industrial	Distribution of Marks			
	Training				
1	Review-I	8	16		
2	Review-II	8	16		
3	Review-III	8	16		
4	OBE- Rubrics	16	32		
	TOTAL MARKS	40	80		

The following are the distribution of marks for the External Examination (CE) in PG Project / /Industrial Training courses

S. No.	For- PG Project courses/ Industrial	Distribution of Marks		
	Training Courses			
1	Record Work and Presentation	40	80	
2	Viva-Voce	20	40	
	TOTAL MARKS	60	120	

• The end semester examinations shall normally be conducted after completing 90 working days for each semester.



• The maximum marks for each theory and practical course (including the project work and Viva-Voce examination in the final Semester) shall be 100 with the following breakup.

(i) Theory Courses

Continuous Internal Assessment	(CIA)	: 25 Marks
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End Semester Exams (ESE) : 75 Marks

(Online Exam: 10 Marks &Written Exam: 65 Marks)

(ii) For Practical Courses

Continuous Internal Assessment (CIA)	: 40 Marks
End Semester Exams (ESE)	: 60 Marks

Continuous Assessment OBE Rubrics Score Sheet Degree: _____ Branch: _____ Semester: _____ Course Code: _____ Course: _____ Internal:_____ External: _____ Max. Marks: Total: _____ THEORY / RUBRICS ASSESSMENT (SELECT ANY ONE) PRACTICAL & Total Marks out of : 16 / 10 / 08 / 04 LIBRARY PAPERS / CLASS ASSIGNMENTS CLASS REPORTS PRESENTATION (15) PARTICIPATION (15) (15) (15) (Compulsory) integration of Knowledge Reference / Experiments Duration of Presentation REG. NO Creativity and Speaking No. Fotal Marks out of : 30 Content & Coherence ഗ Format & Spelling Format & Spelling **Demonstration** of Demonstration of S Drganization Interaction & Participation **Snowledge Supwledge** mowledge Reference ibrary Skills 3 5 5 5 5 5 5 5 6 3 3 5 5 1



a) Utilization of Library

Hours spent in Library	Marks	Type of Document submitted
2	1	
4	2	
6	3	Report/
8	4	Assignment/ Class presentation
10	5	
12	6	

Marks will be awarded to the student based on the hours spent in the library after the working hours and submission of report by the student.

- During the Library hour, the student must spend time in reading the articles, books, journals of their subject of interest
- Each student should borrow minimum three books during the semester

b) Class Participation

Active participation in classroom discussion by the student will be evaluated based on Integration of knowledge, Interaction and Participation and demonstration of knowledge.

c) Papers / Reports/ Assignments/ Class Presentation

The student will be evaluated based on his ability to do analysis of application of theory to real world problems or creative extension of class room learning and his/her ability to communicate the given topic effectively and clearly. The following are the distribution of marks for the continuous internal assessment in PG practical courses

4. FOR PROGRAMME COMPLETION

Programme Completion (for students admitted during the A.Y.2019-20 and Onwards)

Student has to complete the following:



- i) Core, EDC, DSE, Project as mentioned in the scheme
- ii) Internship / Industrial/ Institutional training as mentioned in the scheme

Students must undertake industrial / institutional training for a minimum of 15 days and not exceeding 30 days during the II semester summer vacation. The students will submit the report for evaluation during III semester.

Based on the performance Grade will be awarded as follows:

Marks Scored	Grade to be awarded
75 and above	А
60-74	В
50-59	С
< 50	Re-Appearance



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1CA	CORE: RELATIONAL DATABASE MANAGEMENT SYSTEM	CORE	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts, techniques, and applications of the database management technology
- The techniques of database Design and Querying
- The hands-on experience to use an existing database management system to develop a database application system

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To learn about structure of relational databases.	K2
CO2	2 To know about the structured query language	
CO3	To know about ER model	K2
CO4	To learn about querying and transactions	К3
CO5	To learn about Oracle No SQL database	K2

MAPPING WITH PROGRAMME OUTCOMES

COs\POs	PO1	PO2	PO3	PO4	PO5		
CO1	М	М	М	S	S		
CO2	М	S	S	S	М		
CO3	S	S	М	М	S		
CO4	М	М	М	S	М		
CO5	М	М	М	М	М		
S	Strong	М	Medium	L	Low		



10 H

10 H

Total Credits: 4 **Total Instructions Hours:** 48 H

Syllabus

Unit I Relational Databases

Introduction to the Relational Model - Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages - Relational Operations - Introduction to SQL- Overview of the SQL Query Language-SQL Data Definition- Basic Structure of SQL Queries- Additional Basic Operations- Set Operations - Null Values - Aggregate Functions - Nested Sub queries - Modification of the Database.

Unit IIIntermediate and Advanced SQL9 H

Join Expressions -Views - Transactions - Integrity Constraints - SQL Data Types and Schemas - Authorization -Accessing SQL From a Programming Language -Functions and Procedures - Triggers - Recursive Queries- Advanced Aggregation Features-OLAP.

Unit III Database Design

Database Design and the E-R Model-Overview of the Design Process- The Entity-Relationship Model - Constraints - Removing Redundant Attributes in Entity Sets -Entity-Relationship Diagrams - Reduction to Relational Schemas - Entity-Relationship Design Issues - Extended E-R Features-Relational Database Design-Features of Good Relational Designs - Atomic Domains and First Normal Form -Decomposition Using Functional Dependencies.

Unit IVQuery Processing and Transaction Management9 H

Query Processing - Overview - Measures of Query Cost - Selection Operation -Sorting - Join Operation - Other Operations - Evaluation of Expressions -Transactions-Transaction Concept-A Simple Transaction Model - Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability-Transaction Isolation and Atomicity - Transaction Isolation Levels -Implementation of Isolation Levels -Transactions as SQL Statements



Introduction to No SQL Systems-Big Data and No SQL, Types of Big Data Processing-No SQL vs Relational Database –Types of No SQL databases-Oracle No SQL High Level Architecture-Intelligent Client Driver-Storage and Network Topology-Hashing, Partitions and Data Distribution-Storing Records-Log Structured Storage-Writing, Reading ,Updating and Deleting Records



Text Books

1 Abraham Silberchatz, Henry F.Korth, S.Sudharshan, 2011 "Database System Concepts", Sixth Edition, McGraw Hill.

Ashok Joshi, Chaitanya Kadaru, Aalok Muley, Maqsood Alam, 2013 "Oracle

2 NoSQL Database: Real-Time Big Data Management for the Enterprise", McGraw Hill Osborne Media, Oracle Press.

References

- 1 C.J.Date, A.Kannan, S.Swamynathan ,2009, "An Introduction to Database Systems ",Eighth Edition, Pearson Education.
- 2 Ramez Elmasri, Shamkant B.Navathe, 2009, "Fundamentals of Database Systems ",Fifth Edition, Pearson Education



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1CB	CORE: ADVANCED JAVA PROGRAMMING	Core	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- Graphical User Interface (GUI), multithreading
- Networking and Database manipulation.
- Servlets and Remote Method Invocation

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level		
CO1	Understand the Basic OOPS and History of the Java Programming			
CO2	CO2 Demonstrate Even Handling programming techniques			
CO3	Demonstrate and Develop database connectivity skills	K3		
CO4	Implement the Servlet and JSP concepts in applications and develop small project	K4		
CO5	Analyze effective technique follow to develop EJB application	K4		

MAPPING WITH PROGRAMME OUTCOMES

Μ

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	М	S	М
CO2	М	S	S	М	М
CO3	S	S	S	М	S
CO4	М	М	М	S	М
CO5	М	S	S	М	М

Medium



S

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Strong

Low

L

SEMESTER I

Total Credits: 4

Total Instructions Hours: 48 H

Syllabus

Unit IJava Fundamentals9HJava Fundamentals-Data types -Operators -Control Statements-Classes and
objects.9H

Classes and Interfaces Unit II 9H Methods and Classes -Inheritance -Packages -Interfaces -Exceptional Handling Unit III 10H Files and Event Handling Windows, Collections-File and Streams -Networking -Event Handling -AWT: Controls, Layout Managers and Menus –Swing –JDBC. Unit IV Servlets and JSP 10H Java Servlets: Design -Life Cycle-cookies -Session tracking-Java Server Pages: Overview -Implicit Objects -Scripting -Standard Actions-Directives Unit V Remote Method Invocation 10H

Remote Method Invocation: Remote Interface –Naming Class –RMI Security Manager Class –RMI Exceptions –Creating RMI Client and Server Classes.



Text Books

- 1 Herbert Schildt, 2011, "The Complete Reference JAVA 2", Eighth Edition, Chapters: 1-10, 17, 19, 20, 22-24, 29, 31.
- 2 Deitel & Deitel ,2008 , "Java How to Program" ,Pearson Education ,Seventh Edition. Chapters: 18,20,24,25.

References

- 1 Muthu, 2004, "Programming with Java", Vijay Nicole Imprints Private Ltd
- 2 Cay.S. Horstmann, Gary Cornel, 2004, "Core Java 2 Vol. II- Advanced Features", Pearson Education.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1CC	CORE: CLOUD COMPUTING	Core	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- Cloud Computing Techniques and Concepts •
- To Implement various Cloud computing concepts ٠
- Cloud Infrastructure and Security •

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understanding the cloud computing.	K2
CO2	To learn about Data Storage in the Cloud	K2
CO3	To know about General Security Advantages of Cloud- Based Solutions	К3
CO4	To know about Managing the Cloud	K3
CO5	To learn about Designing Cloud Based Solutions	К3

MAPPING WITH PROGRAMME OUTCOMES

Μ

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	М	М	М	S	М
CO3	S	М	M M	М	S
CO4	S	S	S	S	М
CO5	М	М	М	М	S
S	Strong	M	Modium	T	Low

Medium



Strong

M.Sc. CS (Students admitted during the AY 2019-20)

Low

L

Total Credits:4Total Instructions Hours:48 H

Syllabus

Unit I Introduction to Cloud

First Drive: Introduction Cloud Computing – Essentials - Benefits - Why Cloud? -Business and IT Perspective - Cloud and Virtualization - Cloud Service Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics - Cloud Adoption - Cloud Rudiments. Introduction - Cloud Characteristics: On-Demand Service - Ubiquitous Network Access – Location-Independent Resource Pooling (Multi-Tenant) - Rapid Elasticity-Measured service

Unit II Cloud Deployment

Cloud Deployment Models :Public clouds – Private Clouds – Hybrid Clouds – Community Clouds – Shared private clouds – Dedicated Private Clouds – Dynamic Private Clouds – Cloud Models Impact – Savings and Cost Metrics – commoditization in cloud Computing - Security in a Public Cloud – Public Versus Private Clouds - Cloud Infrastructure Self-Service – Cloud as a Service: Introduction - Gamut of Cloud Solutions :Platform-as-a-Service – Software-as-a-Service – Infrastructure-as-a-Service.

Unit III Cloud Solutions

Cloud Solutions: Introduction - Cloud Application Planning - Cloud Business and Operational Support Service (BSS and OSS) - Cloud Ecosystem - Cloud Business Process Management - Cloud service Management - On-Premise Cloud Orchestration and Provisioning Engine - Computing on Demand (CoD) -Cloudsourcing. Cloud Management: Introduction: Service-Based Model -Resiliency - Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing, and Metering.

Unit IV Cloud Offerings and Information Security

Cloud Offerings : Introduction - Information Storage, Retrievals, Archive, and Protection - Cloud Analytics :Cloud Business Analytics Competencies - How It Works: Analytics - Testing Under Cloud :Benefits - Value Proposition - The Biggest Benefiters - Cloud Offering Key Themes - Information Security :Expectation of Privacy - Security Challenges - Security compliance - Identity-Based Protection - Data Protection at Cloud - Application Security at cloud Depleoyment - Virtual Desktop Infrastructure - Storage Cloud.



10 H

9H

10H

9H

Cloud Virtualization Technology: Introduction - Virtualization Definition - Virtualization Benefits - Server Virtualization - Virtualization for x86 Architecture - Hypervisor Management Software - Virtual Infrastructure Requirements. Cloud Infrastructure Deep Dive: Introduction -Storage Virtualization - Storage Area Networks - Network-Attached storage - Cloud Server Virtualization - Networking Essential to Cloud



Text Books

1 Dr.Kumar Saurabh, 2014,"Cloud Computing" Second Edition..

References

- 1 Kris Jamsa, 2014, "Cloud Computing" Janes&Bartlett Learning..
- 2 Anthony T.Velte, Toby J.Velte, Robert Elesepeter, 2013,"CLOUD COMPUTING-A PRACTICAL APPROACH", McGraw Hill Education



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1CD	CORE:INTERNET OF THINGS	Core	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- IoT concepts, IoT technologies, Creative thinking techniques, Co-creation • techniques.
- The possibilities offered by the different IoT technologies •
- To find innovative applications of combinations of various technologies in
- real-life scenarios

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To know about Internet of Things	К2
CO2	To learn about Domain Specific IoTs	K2
CO3	To Know about IoT Platforms Design Methodology	К3
CO4	To learn about IoT Physical Devices and Endpoints	K3
CO5	To learn about case study for IoT design	K2

MAPPING WITH PROGRAMME OUTCOMES

COs\POs	PO1	PO2	PO3	PO4	PO5		
CO1	S	М	М	S	М		
CO2	S	S	S	S	S		
CO3	S	М	S M	М	S		
CO4	М	М	М	S	М		
CO5	М	S	S	М	М		
SUCRASC	Strong	М	Medium	L	Low		



M.Sc. CS (Students admitted during the AY 2019-20)

9 H

9 H

10 H

SEMESTER I

Total Credits: 4

Total Instructions Hours: 48 H

Syllabus

Unit I Introduction to IoT

Introduction to Internet of Things: Introduction-Physical Design of IoT-Logical Design of IoT-IoT Enabled Technologies-IoT Levels and Deployment Templates. IoT and M2M: Introduction-M2M-Difference between IoT and M2M-SDN and NFV for IoT..

Unit II Domain Specific IoTs

Domain Specific IoTs: Introduction-Home Automation-Citites-Environment-Energy-Retail-Logistics-Agriculture-Industry-Health and Lifestyle. IoT System Management: Need for IoT System Management-SNMP-Network Operator Requirements

Unit III IoT Platforms

IoT Platforms Design Methodology: Introduction-IoT Design Methodology-Case Study on IoT System for Weather Monitoring –Motivation for Using Python. IoT Systems-Logical Design using Python: Introduction- Installing Python-Python Data Types and Data Structures-Control Flow-Functions-Modules-Packages-File Handling-Date/Time Operations-Classes-Python Packages of Interest for IoT..

Unit IVIoT Physical Devices and Endpoints10 H

IoT Physical Devices and Endpoints: IoT Device-Exemplary Device: Raspberry Pi-About the Board-Linux on Raspberry Pi-Raspberry Pi Interfaces-Programming Raspberry Pi with Python-Other IoT Devices. IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs-WAMP-Autobahn for IoT-Xively Cloud for IoT-Python Web Application Framework-Django-Designing a RESTful Web API-Amazon Web Services for IoT-SkyNet IoT Messaging Platform.

Unit VCase Study & Data Analytics for IoT10 H

Case Studies Illustrating IoT Design: Introduction-Home Automation-Cities-Environment-Agriculture-Productivity Applications. Data Analytics for IoT: Introduction-Apache Hadoop-Using Hadoop Map Reduce for Batch Data Analysis-Apache Oozie-Apache Spark-Apache Strom-Using Apache Storm for Real-Time



Dr NGPASC Analysis.. COIMBATORE | INDIA

Text Books

1 Arshdeep Bahga, Vijay Madisetti, 2015, "Internet of Things-A Hands-on Approach", University Press..

References

1 Ian G.Smith, 2012 "The Internet of Things2012 New Horizons", IREC-Internet of Things European Research Cluster



CORE PRACTICAL : RELATIONAL DATABASE MANAGEMENT SYSTEM

Total Credits:2Total Instructions Hours:60 H

S.No

Contents

Create a table for ticket reservation details with necessary fields. Insert

1 the data values and modify the table using INSERT, ALTER, MODIFY DROP keywords.

Create a table for employee details with employee number as primary key, Emp_Name, Address, designation, department, Age, Gender, DOJ,

2 Net Salary and Gross Salary. Insert the values, group the employees using department and sort them.

Write a PL/SQL program for student table with Register No as primary

3 key, student name, subject marks and average. Update the table by adding distinction field.

Create a table for railway reservation with necessary fields. Insert the

data values and use DCL and TCL commands like GRAND, REVOKE,COMMIT, ROLL BACK and SAVE POINT commands.

Create a table for library management system with two tables master

- 5 and transaction tables and create a report based on the date of return column.
- 6 Create a table for book store and write a PL/SQL to update the rate field with 25% increment and display the result.
- 7 Update the above student table with result field and write a PL/SQL to split the table into two based on the result field.
- 8 Create a table for electricity bill calculation using cursor programming

9 Write a PL/SQL program to trigger Ticket reservation table to display the ticket booked to CHENNAI.

10 Write a program to generate a report for employee details table.



CORE PRACTICAL :ADVANCED JAVA PROGRAMMING

SEMESTER I

Total Credits:2Total Instructions Hours:60 H

S.No	Contents
1	Implementation of Multi threading Concept.
2	Implementation of Exception handling.
3	Implementation of I/O Streams.
4	Implementing AWT Components.
5	Implementing Swing and Event handling.
6	Network Programming.
7	Programs using JDBC.
8	Implementing Servlets / JSP.
9	Remote Method Invocation.
10	Implementation of Client /Server Socket Connection.


Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1DA	ELECTIVE :ADVANCED COMPUTER ARCHITECTURE	Elective	4	0	0	4

This course has been designed for students to learn and understand

- The major components of Advanced Computer Architecture.
- Parallel processing, solving problems in parallel and SIMD processors, SIMD arrays.
- Implementation of Parallel Processing and Pipelining concepts for real time Problems

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To learn about parallel processing	K2
CO2	To learn about Solving Problems in Parallel	K2
CO3	To know about Principles Linear Pipelining, design and Characteristic.	К3
CO4	To demonstrate SIMD Array Processors	K4
CO5	To design Parallel Algorithms	К5

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	М	S	S
CO2	М	М	М	М	М
CO3	М	S	S	S	S
CO4	S	М	М	S	S
CO5	М	М	М	М	S



Μ Medium

SEMESTER I

Total Credits:4Total Instructions Hours:48

Syllabus

Unit IIntroduction to parallel processing10H

Introduction to parallel processing – Trends towards parallel processing – Parallelism in Uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Flynn' Classification – Feng's Classification – Handler's Classification – Parallel Processing Applications.

Unit IISolving Problems in Parallel processing9H

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter-task Dependency. Instructional Level Parallel Processing – Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining.

Unit III Pipelining

Principles Linear Pipelining – Classification of Pipeline Processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics – Pipelined Vector Processing methods.

Unit IV SIMD

SIMD Array Processors – Organization – Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Iliac – Cube interconnection network – Shuffle-Exchange and Omega networks - Multiprocessor Architecture and programming Functional structures – interconnection Networks.

Unit V Parallel Algorithms

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.



10H

9H

10H

- 1 Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing", MGH, [Unit I, III, IV].
- 2 Rajaraman.V, C. Siva Ram Murthy, , 2004, "Parallel Computers Architectures and Programming, [Third Edition], PHI, [Unit II, V].

References

- 1 Kai Hwang, 2011, "Advanced Computer Architecture Parallelism, Scalability, Programmability", Tata McGraw Hill.
- 2 Michael J. Quinn, 2009, "Parallel Computing Theory and Practice", [Second Edition], TMH.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1DB	ELECTIVE:OBJECT ORIENTED ANALYSIS AND DESIGN	Elective	4	0	0	4

This course has been designed for students to learn and understand

- To acquire knowledge on trends and principles of object oriented methodologies.
- To Gain problem solving skills using object based models.
- The application of unified Modeling Language

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To learn about Object Oriented System Development and basics	K2
CO2	To learn about Object Oriented System DevelopmentMethodology,BoochMethodology,JacobsonMethodologies, Patterns and Unified approach.	K2
CO3	To know about Unified Modeling Language, UML Class Diagram and UML Dynamic Modeling.	К3
CO4	To demonstrate OO Design axioms, Designing Methods and Protocols.	K4
CO5	To design Quality Assurance testing	К5

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	М	S	S
CO2	М	М	М	М	М
CO3	S	S	S	М	S
CO4	S	М	М	S	М
CO5	М	М	М	М	S



9H

10H

SEMESTER I

Total Credits: 4

Total Instructions Hours: 48 H

Syllabus

Unit IIntroduction to Object Oriented Systems9H

Object Oriented System Development: Introduction- Object Oriented Systems Development Methodology- Why an Object Orientation. Object Basics: Introduction – Objects – Attributes – Object Behavior and Methods – Encapsulation and Information Hiding – Class Hierarchy – Object Relationships and Associations – Polymorphism – Aggregations and Object Containment. Static and Dynamic Binding.

Unit IIObject Oriented System Development10H

Object Oriented System Development: Analysis – Design – Prototyping. Methodologies: The Booch Methodology: The Macro Development – The Micro Development Process. The Jacobson et al Methodologies: Use cases- Object Oriented Software Engineering – Object Oriented Business Engineering. Patterns: Generative and Non generative patterns- Pattern Templates- Anti patternscapturing patterns. Unified approach: Analysis – Design – Modeling based on Unified Modeling Language.

Unit III Unified Modeling Language

Unified Modeling Language: Introduction – Static and Dynamic Models – UML Diagrams – UML Class Diagram: Class Notation – Object Diagram – Class Interface Notation- Binary Association Notation- Association Rule – Qualifier- Multiplicity-OR Association- N-Ary Association – Aggregation and composition-Generalization – Use Case Diagram – UML Dynamic Modeling: UML Interaction Diagrams – Sequence diagrams – collaboration diagrams – state chart diagram – Activity diagram.

Unit IV OO Design

OO Design axioms: Design axioms. Designing Classes: Introduction – Design philosophy – UML Object Constraint Language- The process – Class visibility: Private and protected protocol Layers – Public Protocol Layer- Refining attributes: Attribute types – UML Attribute Presentation. Designing Methods and Protocols: Design Issues - UML Operation presentation. Access layer: Introduction – OODBMS: OOD Vs Traditional Databases- Object Relational Systems: Mapping – Table class Mapping – Table Multiple class Mapping-Table. Inherited V2019-200



42 Mapping- Keys for Instance Navigation. View layer: Introduction – Designing view layer classes.

Unit VQuality Assurance Testing10H

Quality Assurance testing: Quality assurance tests- Testing Strategies- Impact of Inheritance in testing – Test Cases: Guidelines for developing Quality Assurance Test cases. Test Plan: Guidelines for Developing test plans. Usability testing: Guidelines for developing Usability Testing. User Satisfaction Testing: Guidelines for developing a User Satisfaction Testing.



1 Ali Brahmi, 2013, "Object Oriented System Development", Tata McGraw-Hill International Edition, [Unit I to V].

References

- 1 Addison-Wesley, Grady Booch, 2010 "Object-Oriented Analysis and Design", [Second Edition]. Pearson Education Asia
- 2 James Rumbaugh, Micheal Blah, 2001, "Object Oriented Modeling and Design", [Tenth Edition], Prentice Hall of India.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A1DC	ELECTIVE: MOBILE COMPUTING	Elective	4	0	0	4

This course has been designed for students to learn and understand

- Concept of wireless mobile computing.
- GSM , GPRS architecture and its Services
- World Wide Web and its applications.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understanding the Vertical and applications of Wireless Networking	K2
CO2	To know about Space division multiplexing	K2
CO3	To learn about Comparison of S/T/F/CDMA	К3
CO4	To demonstrate the UMTS and IMT	K4
CO5	To design a case study on World Wide Web	К5

MAPPING WITH PROGRAMME OUTCOMES

COs\POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	М	М	М	S	М
CO3	S	S	S	М	S
CO4	S	S	S	S	М
CO5	М	М	М	М	S



S Strong

M Medium

L Low

M.Sc. CS (Students admitted during the AY 2019-20)

Total Credits:4Total Instructions Hours:48 H

Syllabus

Unit I Introduction to Wireless Networking

Introduction – Vertical and applications of Wireless Networking – Positioning of Wireless networking relative to wired networks – Wireless LAN and Wireless WAN – Wireless PBXs map – The Radio Spectrum cell size and achievable throughput. Wireless transmission – Frequencies for radio transmission – Regulations – Signals, Antennas, Signal propagation, path loss of radio signals, Additional signal propagation effects- Multi-path propagation – Multiplexing.

Unit II Multiplexing

Space division multiplexing – Frequency division multiplexing – time division multiplexing – Code division multiplexing. Spread spectrum – Direct sequence spread spectrum – Frequency hopping spread spectrum – Cellular systems. Medium access control – Hidden and exposed terminals – Near and far terminals – SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, slotted Aloha, Carrier sense multiple access– Reservation TDMA – Multiple access with collision avoidance – Polling – CDMA – Spread Aloha multiple access. Comparison of S/T/F/CDMA.

Unit III GSM

GSM – Mobile services – System architecture – Radio interface – Protocols – Localization and calling –Handover – Security – Location Management for Mobile Cellular Systems – GPRS – Mobile services – System Architecture.

Unit IV MAC and Mobile Network Layer

UMTS and IMT – 2000.Wireless LAN – Infra red vs. radio transmission – Infrastructure and ad-hoc network – IEEE 802.11 – System architecture – Protocol architecture – Physics layer – Medium access control layer – MAC management – Blue tooth. Mobile network layer – Mobile IP – Goals, assumptions and requirements – entities and terminology – packet delivery – Agent discovery – Registration – Tunneling and encapsulation Recent technologies.

Unit V World Wide Web

World Wide Web - WAP – Architecture – wireless datagram Protocol, Wireless transport layer security, Wireless transaction protocol, Wireless session protocol, Wireless application environment, Wireless markup language, WML script –



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10H

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1 John Schiller, 2003. Mobile Communications, Addison Wesley.

References

- 1 Steve Mann and Scoot Schibli, The Wireless Application Protocol, John Wiley &Sons, inc.
- 2 Steve Mann, 2000. Programming Applications With The Wire Less Application Protocol, John Wiley & Sons, Inc.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2CA	CORE : DESIGN AND ANALYSIS OF ALGORITHMS	CORE	4	0	0	4

This course has been designed for students to learn and understand

- To learn the fundamental concepts of design and analysis of algorithms
- To apply important algorithmic design paradigms and methods of analysis
- To understand the different algorithmic techniques

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To interpret the complexity of algorithms and paradigms to solve problems	K2
CO2	To show and understand Divide and Conquer technique for effective problem solving in computing	K2
CO3	To apply Greedy technique to solve problems in different approach	К3
CO4	To analyze the complexities of various problems in different domains	K4
CO5	To make use of Backtracking, Branch and Bound techniques to solve optimization problem	К3

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	S	L	М
CO2	М	S	L	М	S
CO3	L	L	М	S	S
CO4	М	L	S	М	L
CO5	S	S	М	М	М
S Strong M Medium L Low					



Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Introduction

Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – The Analysis Framework – Asymptotic Notations and Basic Efficiency Classes – Mathematical Analysis for Recursive and Nonrecursive Algorithms

Unit II Divide and Conquer Method

Divide and Conquer Methodology – Mergesort: Algorithm – Quicksort: Algorithm – Binary Tree Traversals and Related Properties: Algorithm – Multiplication of Large Integers – Strassen's Matrix Multiplication

Unit III Greedy Method

Greedy Technique – Prim's Algorithm: Definition - Algorithm – Kruskal's Algorithm: Definition - Algorithm - Disjoint Subsets and Union - Find Algorithms – Dijkstra's Algorithm: Definition - Algorithm – Huffman Trees and Codes: Definition - Algorithm

Unit IV Dynamic Programming

Three Basic Examples: Algorithm - Knapsack Problem and Memory Functions: Definition - Algorithm - Optimal Binary Search Trees: Definition - Algorithm - Warshall's Algorithm: Definition - Algorithm - Floyd' Algorithm for the All-Pairs Shortest-Paths Problem: Definition - Algorithm.

Unit VBacktracking and Branch and Bound10 h

Backtracking – N-Queens Problem – Hamiltonian Circuit Problem – Subset-Sum Problem – Branch and Bound – Assignment Problem – Knapsack Problem – Traveling Salesman Problem.



9 h

10 h

9 h

10 h

1 Anany Levitin, (2017). Introduction to the Design and Analysis of Algorithms. (3rd Edn.) New Delhi: Pearson.

References

- 1 Sridhar, S. (2014). Design and Analysis of Algorithms. (1st Edn.) Noida: Oxford University Press.
- 2 Tanenbaum, A.M. (2008). Data Structures Using C. (2nd Edn.) New Delhi: Prentice Hall of India.

Ellis Horowitz, SartajSahni and Sanguthevar Rajasekaran. (2008).

- **3** Fundamentals of Computer Algorithms. (2nd Edn.) New Delhi: Universities Press Private Limited.
- 4 Ellis Horowitz and Sartaj Sahni. (2003). Fundamentals of Data Structures. (2nd Edn.) Gurgaon: Galgotia Publication.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2CB	CORE : INTERNET PROGRAMMING	CORE	4	0	0	4

This course has been designed for students to learn and understand

- To learn the Basics of HTML, XML and CSS and their implementation
- To focus on the Concepts of JavaScript, AJAX and AngularJS
- To design and deploy Web Services

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To show about HTML5 and CSS	K2
CO2	To interpret XML and Java Script	K2
CO3	To utilize the Web Servers	K3
CO4	To summarize about Angular JS Concepts	K2
CO5	To make use of AJAX and Web Services	K3

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	S	L	S
CO2	М	L	S	М	L
CO3	S	М	М	L	S
CO4	S	М	L	S	М
CO5	S	М	L	S	М
S Strong M Medium L Low					



Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Introduction to Markup Language

Introduction HTML5: Editing HTML5 documents - First HTML5 - W3C HTML5 Validation Service - Headings - Images - List - Tables - Forms - Cascading Style Sheets: Inline styles - Embedded style sheets - Conflicting styles - Linking External style sheets - Backgrounds - Box model and Text Flow - Dropdown menus

Unit IIBasics of XML and JavaScript1

XML Basics - Structuring data - XML namespaces - Document Type Definition-W3C XML Schema Documents - XML Vocabularies - Java Script: Your First Script and Modifying first script - Obtaining user inputs with prompt dialogs - Control statements: if, if..else, while, for repetition statements-switch multiple selection statements-do..while repetition statements - break and continue statements -Function Definition: Random number Generation -Recursion - Recursion Vs Iteration

Unit III Java Script and Web Servers

Arrays - Declaring and allocating Arrays - Random Image Generator Using Arrays - Objects: math, string, date, boolean and number objects - Events: Reviewing the load Event - Event mouse move and event object - Rollovers with mouseover and mouseout - Web servers: HTTP Transactions - Multitier Application Architecture -Client Side Scripting Vs Server Side Scripting - Accessing Web Servers

Unit IV Angular JS

Basics of AngularJS – Data Binding and your first AngularJS Web application – Modules – Scopes – Controllers – Expressions – Filters – Introduction to Directives– Built in Directives: Basic ng Attribute Directives- Directives with Child Scope – Angular Module Loading: Configuration - Run Blocks -Services– Events

Unit V Ajax and Web services

Ajax: Rich Internet Applications (RIA's) with Ajax – History of Ajax– Raw Ajax Example using the XMLHttpRequest Object – Creating a full scaled Ajax Enabled Application - Web Services: Building Blocks – Basics of Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery, and Integration (UDDI)



9 h

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10 h

10 h

9 h

Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, (2018). Internet & World Wide

- 1 Web How to Program. (5th Edn.) : Deitel series. (Unit I to Unit III, Unit V (5.1, 5.2, 5.3, 5.4, 5.5).
- 2 Ari Lerner, (2013). ng-book The Complete Book on AngularJS, Fullstack.io. (5thEdn.): (Unit IV).

References

Ron Schmelzer, Travis Vandersypen, Jason Bloomberg, Madhu Siddalingaiah, Sam hunting, Micheal D.Qualls, David Houlding, Chad

- 1 Darby, Diane Kennedy,. (2012). XML and Web Services. (2nd Edn.) Noida: Pearson (Unit V (5.6, 5.7, 5.8).
- 2 Bruce Lawson, Remy Sharp, (2012). Introducing HTML5. (2nd Edn.) New Delhi: New Riders.
- 3 Mathew Eernisse. (2006). Build Your Own AJAX Web Applications. (1st Edn.) New Delhi: SitePoint.
- 4 Eric Newcomer, (2002). Understanding Web Services: XML, WSDL, SOAP, and UDDI. (1st Edn.) New Delhi: Addison-Wesley.



Course Code	Course Name	Category	L	Т	Р	Credit
194IT2A2EA	EDC: DIGITAL MARKETING	EDC	4	0	0	4

This course has been designed for students to learn and understand

- To learn the different styles of marketing
- To understand the concept of marketing through social media
- To apply the marketing strategies in real time environment

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To show the digital marketing strategies	K1
CO2	To demonstrate and understand the nuances of advertising	K2
CO3	To apply the marketing strategies in social media	K3
CO4	To interpret the Web Analytics and Mobile Analytics	K2
CO5	To analyze the marketing strategies with case studies	K4

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	L	М	L
CO2	S	М	L	S	М
CO3	L	М	L	L	М
CO4	М	L	М	S	S
CO5	S	М	L	S	L
S Strong M Medium L Low					



Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Introduction to Digital Marketing

Digital Marketing- internet users- Digital Marketing strategy- Digital Advertising Market in India- Skills required in Digital Marketing- Digital Marketing Plan, Display Advertising- concept- types of display Advertisement- models- Plan-Targeting- Good Ad- programmatic Digital Advertising- Analytic tools- YouTube Advertising

Unit II Search Engine Advertising

Search Engine and Advertising– Analytics – Competition - Understanding Ad Placement- Ad Ranks – Basic Ad Auction Model – Important of AdRank–Search Advertising Account - Architecture – Creating Effective Ads - Ad Campaign -Enhancing AdCampaign – Advanced Ad format – Account Monitoring performance report – Segments – Search Terms – Auction Insights

Unit III Social Media Marketing

Introduction –Social Media Strategy and Implementation - Face book Marketing – Facebook for business – Adverts – Facebook Insight – Design Tools - LinkedIn Marketing - LinkedIn Groups – LinkedIn Analytics - Twitter Marketing- Twitter in India –Twitter Ads – Twitter Analytics – Twitter Management and Monitoring Tools - Instagram and Snapchat Apps - Mobile Marketing

Unit IV Search Engine Optimization

Introduction- Search Engine – concepts- On page and off page Phasesoptimizations- Social Media reach- Maintenance. Web Analytics: Introduction- Data collection- Key Metrics- making web- Analytic Aeconable- multi Channel Advertising- types of Tracking codes- Mobile Analytics- Universal Analytics-Competitive Intelligence

Unit V Case Shell

Aisel Fashion Shoot- Kotak Securities- The Fall and Rise of Maggi- TATA DOCOMO- ICICI Bank- Merchenders- Benz- DELL- Barclays Business Banking SEO campaign- conversion Tracking through URL builder- A Hotel branch- UAV coach- Philips AirFryor- KanKhajura Station and H&M



9 h

10 h

9 h

10 h

10 h

1 Seema Gupta, (2017). Digital Marketing. (1st Edn.) New Delhi: Wiley.

References

- 1 Puneet Singh Bhatia. (2017). Fundamentals of Digital Marketing. (1st Edn.) Noida: Pearson.
- 2 Philip Kotler. (2017). Marketing 4.0: Moving from Traditional to Digital. (1st Edn.) New Delhi: Wiley.
- 3 Dr.Ragavendra K. and Shruthi P. (2016). Digital Marketing. (1st Edn.)
 Mumbai: Himalaya Publishing House Pvt. Ltd.



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Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2CC	CORE:NETWORK SECURITY	CORE	4	0	0	4

This course has been designed for students to learn and understand

- To learn the fundamentals of security •
- To describe the theory behind the security of different cryptographic algorithms
- To impart knowledge on authentication mechanisms and firewalls

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To show and understand the basic concepts of security	K1
CO2	To explain the different Symmetric Key Cryptographic Algorithms	K2
CO3	To interpret the various key distribution, algorithms and management schemes	K2
CO4	To apply the basic concepts of Internet Security Protocols	K3
CO5	To tell and understand Authentication, Firewall and Virtual Private Network	K1

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	L	М	L
CO2	S	М	L	S	М
CO3	L	М	L	S	М
CO4	L	L	М	L	М
CO5	L	М	L	S	М
S Strong M Medium L Low					

Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Introduction to Concepts of Security

9 h

9 h

Introduction - Need for security - Security approaches - Principles of Security -Types of Attacks. Cryptography Techniques: Plain Text and Cipher Text -Encryption and Decryption - Symmetric and Asymmetric key Cryptography: Symmetric Key Cryptography and the problem of Key Distribution - Diffie-Hellman Key Exchange / Agreement Algorithm - Asymmetric Key Operation. Steganography

Unit II Computer-Based Symmetric Key Cryptographic Algorithms 10 h

An Overview of Symmetric Key Cryptography - Data Encryption Standard (DES): Background and History – Working of DES - Variations of DES. RC5: Background and History – Working of RC5 – RC5 Modes – Blowfish: Operation. Advanced Encryption Standard (AES): Operation - One-Time Initialization Process – Process in each round

Unit III Computer-Based Asymmetric Key Cryptographic Algorithms 10 h

An Overview of Asymmetric Key Cryptography - The RSA Algorithm: Introduction – Examples of RSA – Understanding the Crux of RSA. Digital Signatures: Introduction – Message Digests (MD) – MD5 – Secure Hash Algorithm (SHA) – Message Authentication Code (MAC) – Digital Signature Techniques – Attacks on Digital Signatures

Unit IV Internet Security Protocols

Basic Concepts: Static Web Pages – Dynamic Web Pages – Active Web Pages – Protocols and TCP/IP – Layered Organization. Secure Socket Layer (SSL): The position of SSL in TCP/IP Protocol Suite – Working of SSL – Buffer Overflow attacks on SSL. Secure Hypertext Transfer Protocol (SHTTP). Email Security: Privacy Enhanced Mail (PEM) – Secure Multipurpose Internet Mail Extensions (S/MIME). Security in GSM - Security in 3G

Unit VUser Authentication Mechanisms, Firewalls and Virtual
Private Network (VPN)10 h

User Authentication: Authentication Basics. Passwords: Clear Text Passwords – Something Derived from Passwords. Authentication Tokens: Authentication Token Types. Biometric Authentications: Working of Biometrics. Firewalls: Types of Firewalls – Firewall Configurations. IP Security: IPSec Overview – Authentication Header (AH). Virtual Private Network (VPN): VPN Architecture



- 1 Atul Kahate, (2019). Cryptography and Network Security. (4th Edn.) New Delhi: Tata McGraw-Hill Education Pvt. Ltd.
- 2 Behrouz Forouzan. (2015). Cryptography and Network Security. (3rdEdn.) New Delhi : Tata McGraw-Hill Education Pvt. Ltd.

References

- 1 William Stallings. (2017). Cryptography and Network Security Principles of Practices. (7th Edn.) Noida: Pearson Education Limited.
- 2 Prakash Gupta, C. (2015). Cryptography and Network Security. (1st Edn.) New Delhi: PHI Learning Private Limited.
- 3 Jonathan Katz, Yehuda Lindell. (2014). Introduction to Modern Cryptography. (2nd Edn.) New Delhi: Chapman & Hall.
- 4 Christof Paar, Jan Pelzl (2010). Understanding Cryptography. (1st Edn.) New Delhi: Springer.



194CS2A2CP CORE PRACTICAL : DESIGN AND ANALYSIS OF ALGORITHMS

Total Credits:2Total Instructions Hours:60 h

S.No	Contents
1	Factorial of numbers and Towers of Hanoi using Recursion
2	Implement Matrix multiplication using Nonrecursive approach
3	Divide and Conquer technique to arrange a set of numbers using Mergesort
4	Implement Binary Tree Traversals
5	Implement Kruskal's algorithm using Greedy technique
6	Implement Huffman Trees and Codes using Greedy approach
7	Construct Optimal Binary Search trees using Dynamic Programming
8	Implement Knapsack problem using Dynamic Programming
9	Implement 8-Queens Problem using Backtracking
10	Find the solution of Travelling Salesperson problem using Branch and

Note: Any 8 experiments are mandatory

Bound Technique



CORE PRACTICAL: INTERNET PROGRAMMING

Total Credits:2Total Instructions Hours:60h

S.No

Contents

- 1 Create a web page for a departmental store using tables and forms in HTML5
- 2 Create a e-commerce web page to sell books online using CSS (Inline, External and Embedded).

Create an XML document that contains 10 users Information. Write a

- **3** program, which includes user Id as an input and retrieve the user details from the XML document
- 4 Create a web page that displays the number of days in the current month and year using Java Script functions
- 5 Create a web page to perform various Java Script Events
- 6 Write a Java script program to upload a file and deploy it in web server
- 7 Write an angularJS code for validating user registration form
- 8 Write an angularJS code for an order form that sorts data using filters.
- 9 Create an AJAX enabled application to display the details of customers in a bank.
- 10 Create a web page that displays date and time using web services

Note: Any 8 experiments are mandatory



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2DA	DSE: WIRELESS NETWORKS	DSE	4	0	0	4

This course has been designed for students to learn and understand

- To learn the evolving Wireless Technologies •
- To understand the mobility in Wireless Networks ٠
- To understand various protocols, services and technologies for Wireless • Networks

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To explain the overview of Wireless Systems	K2
CO2	To demonstrate the basic skills of Cellular Communications	K2
CO3	To analyze security, efficiency, scalability and their unique characteristics in Wireless Networks	K4
CO4	To outline Wireless Application Protocol and Bluetooth	K2
CO5	To infer and understand Wireless Sensor Network and WLAN	K2

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	М	L	М
CO2	М	М	М	М	S
CO3	М	S	L M		S
CO4	L	М	S	L	М
CO5	М	S	L	М	S
S Strong M Medium L Low					



10 h

SEMESTER II

Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Introduction to Wireless Systems

An overview of Wireless Systems - First- and Second-Generation Cellular Systems -Cellular Communications from 1G to 3G - Wireless 4G Systems- Future Wireless Networks-Case Study: 5G Technology. Teletraffic Engineering: Service Level-Traffic Usage - Traffic Measurement Units -Call Capacity-Definitions of Terms-Data Collection. An Overview of Digital Communication and Transmission: Baseband Systems - Messages, Characters, and Symbols -Sampling Process - Voice Communication

Unit IICellular Communications and WWAN10 h

Fundamentals of Cellular Communications: Cellular Systems - Hexagonal Cell Geometry - Cochannel Interference Ratio - Cochannel Interference Reduction - Cell Splitting - Adjacent Channel Interference (ACI). Architecture of a Wireless Wide-Area Network (WWAN): WWAN Subsystem Entities - Logical Channels - Channel and Frame Structure -Basic Signal Characteristics -Speech Processing- Power Levels in Mobile Station. Antennas, Diversity and Link Analysis: Antenna System-Antenna Gain – Performance Criteria for Antenna Systems- Diversity

Unit III Mobility Management in Wireless Networks and Security 9 h

Mobility Management in Wireless Networks: Mobility Management Functions -Mobile Location Management - Mobile Registration - Handoff. Security in Wireless Systems: Security and Privacy Needs of a Wireless System - Required Features for a Secured Wireless Communications System - Methods of Providing Privacy and Security in Wireless Systems - Wireless Security and Standards

Unit IV Wireless Application Protocol (WAP) and Bluetooth 10 h

Wireless Application Protocol: WAP and the World Wide Web (WWW) - The WAP Programming Model -WAP Architecture, Advantages and Disadvantages -Applications. Wireless Personal Area Network — Bluetooth : Bluetooth (IEEE 802.15.1) - Definitions of the Terms Used in Bluetooth - Bluetooth Protocol Stack -Bluetooth Link Types ,Security, Network Connection Establishment, Error Correction, Network Topology -Usage Models - Applications -WAP and Bluetooth

Unit V Wireless Sensor Network and WLAN

Wireless Personal Area Networks Low Rate and High Rate: Wireless Sensor <u>DRNGPASC</u> <u>DNGPASC</u> <u>Vireless Sensor Networks</u> - Wireless Sensor Network Model -<u>M.Sc. CS (Students admitted during the AY 2019-20)</u>

⁹ h

Sensor Network Protocol Stack -ZigBee Technology. Wireless Local Area Networks: WLAN Equipment - WLAN Topologies -WLAN Technologies - Other WLAN Standards

Text Books

- Vijay Garg, K (2007). Wireless Communication and Networking. (1st Edn.) : Morgan Kaufmann Publishers.
- ⁵GTechnology:URL: https://www.tutorialspoint.com/5g/5g_introduction.htm

References

- 1 Cory Beard, William Stallings. (2016). Wireless Communication Networks and Systems. (1st Edn.) Noida: Pearson Higher Education.
- 2 Jane Butler, (2013). Wireless Networking in the Developing World. (3rd Edn.) California, US: CreateSpace Independent Publishing Platform.
- 3 Nicopolitidis P, Obadiah M S, Papadimitriou G S and Pomportsis A S. (2009). Wireless Networks. (Edn.) New York: John Wiley and Sons.

Kazem Sohraby, Daniel Minoli, Taieb Znati. (2007). Wireless Sensor

4 Networks Technology, Protocols, And Applications. (1st Edn.) Canada: John Wiley & Sons, Inc.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2DB	DSE:PRINCIPLES OF PROGRAMMING LANGUAGES	DSE	4	0	0	4

This course has been designed for students to learn and understand

- To study various programming paradigms and choose appropriate languages
- To understand High level language design and implementation
- To introduce the power of scripting language

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To tell and discuss the programming language concepts	K1
CO2	To show and learn the storage variables	K1
CO3	To outline the data abstraction concepts	K2
CO4	To spell OOP and Concurrent Programming	K1
CO5	To infer Functional and Logic Programming	K2

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	М	L	М
CO2	М	М	М	S	М
CO3	S	L	М	S	L
CO4	S	М	L	S	М
CO5	L	М	S	М	L
S Strong M Medium L Low					



Total Credits: 4 **Total Instruction Hours:** 48 h

Syllabus

Unit I Programming languages

Programming languages: Programming linguistics, Concepts and paradigms Syntax, semantics, and pragmatics, Language processors - Historical development. Basic Concepts: Values and types: Types-Primitive types - Composite types -Recursive types - Type systems - Expressions

Unit II Variables and storage

Variables and storage: Variables and storage - Simple variables - Composite variables - Copy semantics Vs reference semantics - Lifetime - Pointers - Commands - Expressions with side effects. Bindings and scope: Bindings and environments-Scope-Declarations - Blocks.

Unit III Data abstraction

Data abstraction: Program units, packages, and encapsulation - Abstract types-Objects and classes - Implementation notes. Type systems: Inclusion polymorphism - Parametric polymorphism - Overloading - Type conversions - Implementation notes

Unit IV Imperative, Object-oriented and Concurrent programming 10 h

Imperative programming-: Key concepts - Pragmatics. Case study: C. Object - oriented programming: Key concepts - Pragmatics. Case study: C++. Concurrent programming: Key concepts- Pragmatics. Case study: JAVA

Unit V Functional and Logic programming

Functional Programming: Key concepts - Eager Vs normal-order Vs lazy evaluation – Pragmatics. Logic programming: Key concepts - Pragmatics - Case study: PROLOG. Scripting: Key concepts – Pragmatics - Case study: PYTHON. Conclusion: Language selection - Language design



10 h

9 h

9 h

10 h

 David Watt.A. (2004). Programming Language Design Concepts. (1st Edn.) Noida: John Wiley & Sons Ltd.

References

- 1 Robert Sebesta, W. (2016). Concepts of Programming Languages. (8th Edn.) Noida: Pearson Education Limited.
- 2 Ravi Sethi (2009). Programming Languages Concepts & Constructs. (2nd Edn.) Noida: Pearson Education.
- **3** Franklyn Turbak, David Gifford, Mark A. Sheldon. (2008). Design Concepts In Programming Language, (1st Edn.) Canada: MIT Press.
- 4 Carlo Ghezzi, Mehdi Jazayeri. (2003). Programming Language concepts. (3rd Edn.) Noida: John Wiley & sons.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A2DC	DSE:AUGMENTED REALITY AND VIRTUAL REALITY	DSE	4	0	0	4

This course has been designed for students to learn and understand

- To understand the concepts of Augmented Reality & Virtual Reality
- To learn the ideas of 3D Graphics
- To learn the applications of Augmented Reality & Virtual Reality

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To show the basics of Augmented Reality	K1
CO2	To outline and understand the value of Augmented Reality	K2
CO3	To summarize and understand the applications of Augmented Reality	K2
CO4	To spell the basics of Virtual Reality	K1
CO5	To define 3D Graphics concept and the applications of Virtual Reality	K1

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	М	L	S	М
CO2	S	М	L	S	М
CO3	S	М	L	S	М
CO4	S	М	М	М	L
CO5	S	М	L	М	L
S Strong M Medium L Low					



Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Augmented Reality and its Types

Introduction: Definition of Augmented Reality (AR) – Components of Augmented Reality – History of Augmented Reality - Augmented Reality 2012 – Difference between Augmented Reality and Virtual Reality (VR) – Challenges with Augmented Reality – Opportunities for Augmented Reality. Types of Augmented Reality: Augmented Reality Works - Augmented Reality Methods – Augmented Reality Display Technology

Unit II The Value of Augmented Reality

The Next User Interface – The Uses of Augmented Reality: Sports Gaming and Entertainment – Education – Medicine – Business and Commerce – Retail and Shopping - Augmented Reality Windshields – Public Safety, The Military and The Law – AR and Law Enforcement: Drone Technology and AR – Collaborative Crime Scene Investigation – AR Flight Tracker

Unit III Organization and Applications of AR

Companies Specializing in Augmented Reality: Total Immersion – Google X – Gravity Jack – AR Toolkit – Metaio – Junaio - Layar – Augmented Reality Tools – Augmented Reality Blogs. Visions of the Future: The Big Trends – The Technical Trends – Future Concepts for Augmented Reality. Interactions in Augmented Reality Applications: Tangible User Interface – Collaborative Augmented Reality Interface

Unit IV Virtual Reality

Definition of Virtual Reality – VR Concepts and Terms – Navigation and Interaction – Immersion and Presence – Not VR – The Internet. Benefits of VR: 3D Visualization – Navigation – Interaction – Physical Simulation – VEs. VR Hardware: Computers – Tracking – Input Devices – Output Devices – Glasses – Displays – Audio. VR Software: VR Software Features – Web-Based VR – Division's dVISE – Blueberry 3D – Boston Dynamics – MultiGen

Unit V 3D Computer Graphics & VR Applications

Computer Graphics to VR – Modelling Objects – Dynamic Objects – Constraints – Collision Detection – Perspective Views – 3D Clipping – Stereoscopic Vision – Rendering the image – Rendering Algorithms – Texture Mapping – Bump Mapping Dr.NGPASC. – Environment Mapping – Shadows – Radiosity – Other Computer Graphics COIMBATORE | INDIA



10 h

9 h

9 h

10 h

10 h

- 1 Gregory Kipper, Joseph Rampolla, (2012). Augmented Reality, An Emerging Technologies Guide to AR. (1st Edn.) Chennai: Elsevier.
- 2 John Vince. (2004). Introduction to Virtual Reality. (1stEdn.) New Delhi: Springer.

References

- 1 Alan Craig, B. (2013). Understanding Augmented Reality Concepts and Applications. (1st Edn.) Chennai: Elsevier.
- 2 Paul Mealy. (2018). Virtual & Augmented Reality. (1st Edn.) New Delhi: John Wiley & Sons, Inc.
- 3 William R. Sherman Alan B.Craig. (2018). Understanding Virtual Reality: Interface, Application, and Design. (2nd Edn.) Chennai: Elsevier.
- 4 Steven. LaValle, M. (2019). Virtual Reality. (1st Edn.) UK: Cambridge University Press.



	Course	Course Name	-	Т		Exa	Ma	Cradita		
Course Code	Category	Course Name	L		P	m (h)	CIA	ESE	Total	Credits
Third Semester	Third Semester									
Part III										
194CS2A3CA	Core - VIII	Open Source Technology	4	-	-	3	25	75	100	4
194CS2A3CB	Core - IX	Big Data Analytics	4	-	-	3	25	75	100	4
194CS2A3CC	Core – X	Software Project Management	4	-	-	3	25	75	100	4
194CS2A3CD	Core - XI	Research Methodology	4	-	-	3	25	75	100	4
194CS2A3CP	Core Practical - V	Open Source Technology	-	-	5	3	40	60	100	2
194CS2A3CQ	Core Practical - VI	Big Data Analytics using R	-	-	5	3	40	60	100	2
194CS2A3DA		Machine Learning								
194CS2A3DB	DSE - III	Soft Computing	4	-	-	3	25	75	100	4
194CS2A3DC		Distributed Operating System								
Total			20	-	10				700	24

EXTRA CREDIT COURSES

The following are the courses offered under self study to earn extra credits:

S. No.	Course Code	Course Name		
1	194CS2ASSA	IPR and Entrepreneurship		
2	194CS2ASSB	Organisational Behaviour		



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3CA	OPEN SOURCE TECHNOLOGY	CORE	4	-	-	4

This course has been designed for students to learn and understand

- The fundamental concepts of Open Source Technology
- learn the setting up environment of MongoDB and Python for data
 exploration
- apply advanced Python techniques for Data Analysis

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the key concepts in developing Open Source Software.	K2
CO2	Relate MongoDB with Python.	K2
CO3	Apply Scientific computing using Numerical Python.	K3
CO4	Implement Data Manipulation and Analysis using Pandas.	K4
CO5	Evaluate Data Visualization using Matplotlib.	K5

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	М	S	S
CO2	S	S	М	S	S
CO3	М	М	М	М	S
CO4	S	S	М	S	S
CO5	S	S	L	S	S
S Strong M Medium L Low					



SEMESTER III

72

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit IIntroduction to Open Source Development10 h

Open Source Software: Introduction - Need For Open Source Applications: Advantages and Disadvantages - History - Meaning and Extraction of the Terms Free Software and Open Source Software - Free Software Foundation and Open Source Initiative Presentation - Security and Reliability - Economical Aspects and Adoption - Applications of Open Source Software. Python Basics: Setting up the Environment - Syntax of Python - Data Types: Numbers - Strings - Tuples and Sequences - List - Dictionaries - Sets - Conditional Statements - Loops.

Unit II MongoDB with Python

Getting Started with MongoDB: Installing - Running - Setting up a Python Environment with MongoDB. Reading and Writing to MongoDB with Python: Connecting to MongoDB with Python - Getting a Database Handle - Inserting a Document into a Collection - Write to a Collection Safely and Synchronously -Guaranteeing Writes to Multiple Database Nodes - MongoDB Query Language -Reading, Counting and Sorting - Updating - Deleting Documents from a Collection - MongoDB Query Operators - MongoDB Update Modifiers.

Unit III Advanced Python: Numpy

Python's World: Python Distributions: Anaconda. PyPI - The Python Package Index - The IDEs for Python: IDLE (Integrated Development Environment) - Spyder -Eclipse. SciPy: Numpy - Pandas - Matplotlib. The NumPy Library: History - The NumPy Installation - Ndarray: The Heart of the Library: Create an Array - Types of Data - The dtype Option - Intrinsic Creation of an Array - Basic Operations -Indexing, Slicing and Iterating - Conditions and Boolean Arrays - Shape Manipulation - Array Manipulation - General Concepts - Structured Arrays -Reading and Writing Array Data on Files.

Unit IV Pandas

Pandas: The Python Data Analysis Library: Installation- Getting Started with pandas - Pandas Data Structures : The Series - The Data Frame - The Index Objects - Other Functionalities on Indexes - Operations between Data Structures : Flexible Arithmetic Methods - Operations between Data Frames and Series - Function Application and Mapping - Sorting and Ranking - Correlation and Covariance -"Not a Number" Data. Pandas: Reading and Writing Data: CSV and Textual Files -"ading Data in CSV or Text Files - Reading and Writing HTML Files - Reading ata from XML - Reading and Writing Data on Microsoft Excel Files - ISON data COMBATORE LINDIA



10 h

10 h

9 h
Unit V Data Visualization using Matplotlib

Data Visualization with matplotlib : The matplotlib Library – Installation - matplotlib Architecture: Backend Layer - Artist Layer - Scripting Layer (pyplot) - pylab and pyplot. Using the kwargs: Working with Multiple Figures and Axes. Adding Further Elements to the Chart: Adding Text - Adding a Grid - Adding a Legend. Saving Your Charts: Saving the Code - Converting Your Session as an HTML File - Saving Your Chart Directly as an Image. Handling Date Values - Chart Typology - Line Chart - Histogram - Bar Chart: Horizontal Bar Chart - Multiseries Bar Chart with Pandas DataFrame - Pie Charts - mplot3d.

Text Books

- 1 Rao M.N., 2015, "Fundamentals of Open Source Software", 1st Edition, PHI Learning Private Limited. (Unit I)
- 2 Niall O'Higgins, 2011, "MongoDB and Python", 1st Edition, O'Reilly(Unit –II)

Fabio Nelli, (2015), Python Data Analytics Data Analysis and Science Using
Pandas, Matplotlib, and the Python Programming Language, 1st Edition, APRESS(Unit-III to Unit – V)

References

RachnaKapur, Mario Briggs, Tapas, Saha, Ulisses Costa, Pedro Carvalho,

- 1 Raul F. Chong, Peter Kohlmann, (2010), Getting started with Open source development, 1st Edition, IBM Corporation
- 2 Wes McKinney, Python, 2018, "For Data Analysis Data Wrangling with Pandas, NumPy, and IPython", 2nd Edition, O'Reilly

David Hows, EelcoPlugge, PeterMembrey, TimHawkins, 2013, "The
Definitive Guide to MongoDB: A Complete Guide to Dealing with Big Data Using MongoDB", 2nd Edition, APRESS.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3CB	BIG DATA ANALYTICS	CORE	4	-	-	4

This course has been designed for students to learn and understand

- The basic concepts of Data Analytics.
- Perform data exploration operation using R language.
- Emphasis on performing Text Mining functions for handling unstructured documents.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand Big Data and Big Data Analytics.	K2
CO2	Remember Hadoop and basics of R.	K1
CO3	Implement R scripts for performing data handling functions.	К3
CO4	Categorize Decision Trees and Time Series Analysis in R.	K4
CO5	Demonstrate Clustering and Text Mining functions in R.	K3

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	S	S	М	S	S	
CO2	М	М	М	S	М	
CO3	S	S	М	S	S	
CO4	М	М	М	S	S	
CO5	S	М	S	М	S	
S Strong M Medium L Low						



SEMESTER III

9 h

Total Instruction Hours: 48 h

Syllabus

Unit IIntroduction to Big Data Analytics10 h

Types of Digital Data: Classification of Digital Data. Introduction to Big Data: Characteristics of Data - Evolution of Big Data - Definition of Big Data - Challenges with Big Data - Volume, Velocity and Variety - Other Characteristics of Data Which are not Definitional Traits of Big Data - A typical Data Warehouse Environment - A typical Hadoop Environment. Big Data Analytics: Data Science - Terminologies used in Big Data Environments.

Unit II Hadoop Environment and Introduction to R 10 h

Introducing Hadoop - History of Hadoop - Hadoop Overview - Use case of Hadoop - Hadoop Distributors - Hadoop Distributed File System (HDFS) - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem. Introduction to R: Downloading and Installing R - IDE's and Text Editors - Handling Packages in R - Working with Directory - Data types in R - Few commands for Data Exploration.

Unit III Loading, Data Handling and Exploring Data in R 10 h

R Expression, Variables and Functions - Missing Values Treatment in R – Vectors – Matrices – Factors – List - Simple Analysis using R - Methods of Reading Data. Exploring Data: Introduction -Data Frames - R function for Understanding Data in Data Frames - Load Data Frames - Exploring Data - Data Summary - Finding the Missing Values - Invalid Values and Outliers - Descriptive Statistics - Spotting Problems in Data with Visualization.

Unit IVDecision Trees and Time Series Analysis9 h

Introduction: Terminologies Associated with Decision Trees - Decision Tree Representation in R - Appropriate problems for Decision Tree Learning - Basic Decision Tree Learning algorithms - ID3 Algorithm - Measuring Features. Case Study: Helping Retailers Predict In-store Customer Traffic. Time Series: Time Series Data-Reading Time Series Data-scan() Function-ts() Function - Plotting Time Series Data - Decomposing Time Series Data. Case Study: Insurance Fraud Detection.

Unit V Clustering and Text Mining

Introduction: Clustering Definition - Basic concepts in Clustering - Hierarchical USTERING - k means algorithm. Case Study: Personalized product - Compared Marcology - A few Challenges in Text Mining - Text Mining Vs Data Mining - Text Mining in R - General Architecture of Text Mining Systems - Preprocessing of Documents in R - Core Text Mining Operations - Text Mining Query Languages.

Text Books

- 1 Seema Acharya, Subashini Chellapan, 2015, "Big Data and Analytics", 2nd Edition, Wiley India Private Limited (Unit I and Unit II (2.1 to 2.9).
- 2 Seema Acharya, 2018, "Data Analytics Using R", 1st Edition, Tata McGraw Hill Education (Unit II (2.10 to 2.15), Unit III, Unit IV and Unit V).

- 1 Bart Baesens, 2014, "Analytics in a Big Data World: The Essential Guide to Big Data and its Applications", 1st Edition, Wiley India Private Limited.
- 2 Simon Walkowiak, 2016, "BigData Analytics with R", Kindle Edition, Packt Publishing.
- 3 Arshdeep Bahga, Vijay Madisetti, 2018, "Big Data Analytics with R and Hadoop", 1st Edition, VPT.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3CC	SOFTWARE PROJECT MANAGEMENT	CORE	4	-	-	4

This course has been designed for students to learn and understand

- Awareness regarding the theoretical and methodological aspects in software project management.
- To learn numerous process models for choosing the appropriate projects.
- Understand the required skills for managing projects, project teams, and stakeholder.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the process of Software Project Management.	K1
CO2	Identify the theoretical and methodological issues involved in modern Software Project Management.	K1
CO3	Prepare the activity planning and evaluate the risks involved in it.	К3
CO4	Analyze project monitoring activities.	K4
CO5	Develop quality products by working as a team.	K3

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	М	М	S	М	М	
CO2	М	М	S	М	М	
CO3	М	М	М	М	М	
CO4	М	L	М	L	М	
CO5	М	S	S	S	М	
S Strong M Medium L Low						



SEMESTER III

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Software Project Management (SPM) 10 h

Importance of SPM - Definition of Project - Software Project Vs Other Types of Project - Contract Management and Technical Project Management - Activities Covered by SPM - Plans, Methods and Methodologies - Some Ways of Categorizing Software Projects - Stakeholders - Setting Objectives - The Business Case - Project Success and Failure - Definition of Management - Management Control -Traditional Vs Modern Project Management Practices. An overview of Project Planning: Step 0 to Step 10. Project Evaluation: A Business Case - Project Portfolio Management - Evaluation of Individual Projects - Cost-benefit Evaluation Techniques - Risk Evaluation.

Unit IISelection of Appropriate Project Approach9 h

Choosing Methodologies and Technologies - Choice of Process Models - The Waterfall Model - The Spiral Model - Software Prototyping - Agile Methods - Extreme Programming (XP) - Selecting the Most Appropriate Process Model. Software Effort Estimation: The Basis for Software Estimating - Software Effort Estimation Techniques - Bottom-up Estimating - The Top-down Approach and Parametric Models - Estimating by Analogy - COCOMO Parametric Productivity Model. Resource Allocation: The Nature of Resources - Identifying Resource Requirements - Scheduling Resources - Creating Critical Paths - Counting the Cost - Being Specific.

Unit III Activity Planning

The Objectives of Activity Planning - Project Schedules - Projects and Activities -Sequencing and Scheduling Activities - Network Planning Model - Formulating a Network Model - The Forward Pass - The Backward Pass - Identifying the Critical path - Activity Float - Shortening the Project Duration - Identifying Critical Activities - Activity-on-Arrow Networks. Risk Management: Definition of Risk -Categories of Risk - Risk Identification - Risk Assessment - Risk Planning - Risk Management - Evaluating Risks to the Schedule - Applying the PERT Technique -Critical Chain Concepts.

Unit IV Monitoring and Control

Creating the Framework - Collecting the Data - Visualizing Progress - Cost Onitoring - Earned Value Analysis - Prioritizing Monitoring - Getting the Project ICK to Target - Change Control. Managing Contracts Types of the Contract Uring tages in 20) Contract Placement - Typical Terms of a Contract - Contract Management -

9 h

Acceptance. Managing People in Software Environments: Understanding Behavior - Organization Behavior: A Background - Selecting the Right Person for the Job -Instruction in the Best Methods - Motivation - The Oldham-Hackman Job Characteristics Model - Stress - Health and Safety - Some Ethical and Professional Concerns.

Unit V Team Work

Working in Teams: Becoming a Team - Decision Making - Organizational Structures - Coordination Dependencies - Dispersed and Virtual Teams -Communication Genres - Communication Plans - Leadership. Software Quality: The Place of Software Quality in Project Planning - The Importance of Software Quality - Defining Software Quality - Product versus Process Quality Management - Quality Management Systems - Process Capability Models - Techniques to Help Enhance Software Quality - Testing - Quality Plans. Case Study: Budgeting to Business Beginnings.

Text Books

1 Bob Hughes, Mike Cotterell, Rajib Mall, 2017, "Software Project Management", 6th Edition, Tata McGraw Hill.

References

- 1 Adolfo Villafiorita, 2014, "Introduction to Software Project Management", CRC Press.
- 2 S.A. Kelkar, 2013, "Software Project Management A Concise Study", 3rd Edition,PHI Learning Private Limited.

Bharat Bhushan Agarwal, Shivangi Dhall, Sumit Prakash Tayal, 2011,

3 "Software Project Management", 1st Edition, University Science Press Pvt. Ltd.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3CD	RESEARCH METHODOLOGY	CORE	4	-	-	4

This course has been designed for students to learn and understand

- the fundamental concepts of Research Methodology.
- learn different types of data collection methods for solving research problems.
- Emphasis on doing Research paper and Thesis Writing.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of research problem and research design.	K2
CO2	Understand the measurement and scaling techniques.	K2
CO3	Experiment different data collection methods for doing research process.	K4
CO4	Demonstrate Sampling and Hypothesis Testing.	K3
CO5	Develop Research Paper and Thesis Writing skills.	K3

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	S	М	М	М	S	
CO2	М	S	L	S	S	
CO3	S	М	М	S	S	
CO4	М	L	L	М	S	
CO5	S	L	L	М	S	
S Strong M Medium L Low						



Total Instruction Hours: 48 h

Syllabus

Unit I Introduction of Research

Meaning - Objectives - Motivation - Types - Research Approaches - Significance of Research - Research Methods Vs Methodology - Research and Scientific Method -Importance of Knowing How Research is Done - Research Process - Criteria of Good Research. Defining the Research Problem: Definition - Selecting the Problem -Necessity of Defining the Problem - Technique Involved in Defining a Problem. Research Design: Meaning - Need for Research Design - Features of Good Design -Important Concepts Relating to Research Design - Different Research Designs -Basic Principles of Experimental Designs.

Unit II Sampling Design, Measurement and Scaling Techniques 10 h

Sampling Design: Census and Sample Survey - Implications of a Sample Design -Steps in Sampling Design - Criteria of Selecting a Sampling Procedure -Characteristics of a Good Sample Design - Different Types of Sample Designs. Measurement and Scaling: Measurement in Research - Measurement Scales -Sources of Error in Measurement - Tests of Sound Measurement - Technique of Developing Measurement Tools - Scaling - Meaning of Scaling - Scale Classification Bases - Important Scaling Techniques - Scale Construction Techniques.

Unit III 9 h Data Collection, Processing and Analysis

Methods of Data Collection: Collection of Primary Data - Observation Method -Interview Method - Collection of Data through Questionnaires - Collection of Data through Schedules - Difference between Questionnaires and Schedules - Some Other Methods of Data Collection - Collection of Secondary Data - Selection of Appropriate Method for Data Collection. Processing and Analysis of Data: Processing Operations - Some Problems in Processing - Elements/Types of Analysis - Statistics in Research - Measures of Central Tendency - Measures of Dispersion - Measures of Asymmetry (Skewness) - Measures of Relationship.

Unit IV Sampling, Hypothesis Testing and Chi-Square Test 10 h

Sampling Fundamentals: Need - Definitions - Important Sampling Distributions -Sampling Theory - Estimation - Estimating the Population Mean - Estimating Population Proportion - Sample Size and its Determination. Testing of Hypotheses: Definition - Basic Concepts - Procedure - Flow Diagram - Measuring the Power of a ypothesis Test - Tests of Hypotheses - Important Parametric Tests. Chi-Square 325t: Chi-square as a Test for Comparing Variance CS (Subinsquare dias the AN 2019-20) arametric Test - Conditions for the application of Chi-square Test - Steps Involved

10 h

81

in Applying Chi-Square Test - Important Characteristics of Chi-Square Test.

Unit VPreparation of Thesis and Research Papers9 h

The IMRAD (Introduction, Materials and Methods, Results and Discussion) Structure for Research Reporting – The Structure of a Thesis – Formatting Requirements of a Thesis – Thesis Editing – Research Papers – Selecting a Journal – The Structure of a Research Paper – Other Considerations in the Preparation of Articles – Review and Peer Review – Copyediting and Proofreading – Review Papers – Conference Papers – Electronic Publications – Short notes and Other Forms of Reports – Publish and Flourish.

Text Books

Kothari C.R., Gaurav Garg, 2019, "Research Methodology Methods andTechniques", 4th Edition, New Age International Publishers (Unit I to Unit IV).

2 George Thomas C., 2015, "Research Methodology and Scientific Writing", 1st edition, Ane Books Pvt. Ltd. (Unit V).

- 1 Dr.Shanthi Bhusan Mishra, Dr.ShashiAlok, 2019, "Handbook of Research Methodology", 1stEdition, Edu creation Publishing.
- 2 Dr.Prabhat Pandey, Dr.Meenu Mishra Pandey, 2015, "Research Methodology: Tools and Techniques", 1st Edition, Bridge Center.
- 3 Ranjit Kumar, 2014, "Research Methodology A Step by Step Guide for Beginners", 3rd Edition, Sage Publications.



SEMESTER III

Total Credits: 2 **Total Instructions Hours:** 60 h

S.No

1

List of Experiments

a. Download and Install current version of Python from the Open Source community.

b. Write a Python program to implement Conditional Statements and Loops.

- 2 Implement a Python program to perform List operations.
- **3** Build Student Database and perform data manipulation operations using MongoDB.
- **4** Write a Python script to connect Student Database with MongoDB and perform data storage and retrieval functions.
- 5 Develop a Python script to perform basic operations using NumPy.

Create a structured array for the Students details which includes Student id, Student name, Height, Class and their data types to perform the following operations in it.

a) Sort the array by height

6 b) Sort by class and height if classes are equal

c) Based on height of the students in canonical order sort the student id and display their indices.

d) Sort the student id with increasing height of the students from given students id and height. Display the indices that describes the sort order

Build a DataFrame in Python and display the specific dictionary data includes index and labels to perform:

- a) Display the summary details
- 7 b) Count the number of rows and columns

c) Select the specific rows and columns

d) Count the number of rows with NaN values

e) Iterate the DataFrame to display the specific rows

Build a Dataset in Excel file and create a Python script to import Dataset

into Pandas DataFrame and perform Read / Sort / Export operations in it.



8

operations in it.

Load the 'datasets/exam-scores/exam-scores.csv' into a pandas DataFrame called scores and perform the following:

a) Filter the scores for exam version 'D'.

10 b) Fetch the columns 'Made Own Study Guide' and 'Student Score' from the exam-score dataset. Perform pre-processing operations and store the result into a new DataFrame as Study

c) Load the Study DataFrame and transform the categorical values into numerical values

Write a Python script to read a CSV file from the below link, (https://raw.githubusercontent.com/mwaskom/seaborn-

data/master/diamonds.csv). Perform the following operations in it.

a) Read a Dataset, modify their columns and display the first 6 rows

b) Remove single / multiple columns from diamonds DataFrame and display the result

c) Sort by 'carat' series in diamonds DataFrame.

d) Display the diamonds which satisfy the condition Fair / Good / Premium

e) Compute count, minimum, maximum price for each cut of diamonds in a Data Frame.

f) Display the unique values in a cut series of diamonds DataFrame.

Build CSV file for a company sale data. Perform the following operation in it.

12 a) Draw multiline plots for the number of units sold per month of each product

b) Plot a histogram chart for the total profit of each month

c) Draw a barchart for any sale product of all months.

Note: Any 10 experiments are mandatory



11

SEMESTER III

Total Credits:2Total Instructions Hours:60 h

S.No

Contents

Create Structured / Semi-structured documents to store the basic
 information about students such as roll no, name, date of birth and address of student perform data manipulation operations in it.

Write an R script to

- 2 (i) Calculate the Factorial of a given number
 - (ii) Fibonacci Series and

(iii)Find the factors of a given number.

- ³ Develop an R script to perform mapreduce operations.
- **4** Build an R script to count the number of words in a text file using RHadoop package.

Write an R script to perform

5 (i) Vector Manipulation Operations.

(ii) Matrix Operations.

6 Create an array of two 3x3 matrices each with 3 rows and 3 columns6 from two given two vectors. Print the second row of the second matrix of the array and the element in the 3rd row and 3rd column of the 1st matrix.

Develop R script to

7 (i) Create a list and convert the list created into a vector.

(ii) Create a Data frame and perform various operations on it.

Demonstrate an R script

(i) To perform data import/export (.CSV, .XLS, .TXT) operations using data frames

(ii) Read a csv file and explore the data using various Data Visualization techniques.

- **9** Construct a decision tree using ID3 algorithm and visualize for irisdataset.
- 10 Write an R script to predict the rainfall of a particular region using time series data.



recommendations.

12 Perform Text Mining preprocessing operations on unstructured documents.

Note: Any 10 experiments are mandatory.



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3DA	MACHINE LEARNING	DSE	4	-	-	4

This course has been designed for students to learn and understand

- The fundamental concepts of Machine Learning algorithms.
- learn about Artificial Neural Networks and Convolutional Neural Networks.
- Familiarize with Human Computer Interaction system.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand ideas and concepts of Machine Learning.	K2
CO2	Demonstrate the importance of Decision trees using Weka.	K3
CO3	Analyze Perceptrons Learning Algorithms.	K4
CO4	Apply different approaches of Support Vector Machine and Clustering Techniques.	К3
CO5	Classify various stages in Natural Language Processing.	K4

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	М	М	М	М	S	
CO2	М	L	L	М	S	
CO3	S	М	L	L	S	
CO4	М	М	М	М	S	
CO5	S	М	М	М	S	
S Strong M Medium L Low						



SEMESTER III

Total Instruction Hours: 48 h

Syllabus

Unit I Machine Learning Basics

Introduction: Definition of Machine Learning - History of Machine Learning - Algorithm Types for Machine Learning: Supervised Learning and Unsupervised Learning - Human Touch - Uses of Machine Learning - Data Repositories. Planning for Machine Learning: The Machine Learning Cycle - Defining the Process - Building a Data Team - Data Processing - Data Storage - Data Privacy - Data Quality and Cleaning - Thinking about Input Data - Thinking about Output Data.

Unit II Classification Technique

Working with Decision Trees: The Basics of Decision Trees: Uses for Decision Trees - Advantages of Decision Trees - Limitations of Decision Trees - Different Algorithm Types - Working of Decision Tree - Decision Trees in Weka: The Requirement - Training Data - Using Weka to Create a Decision Tree. Bayesian Networks: Pilots to Paperclips - A Little Graph Theory - A Little Probability Theory - Bayes' Theorem - Working of Bayesian Networks - Node Counts - Using Domain Experts - A Bayesian Network Walkthrough.

Unit III Expert Systems

Artificial Neural Networks: Definition of Neural Network - Artificial Neural Network Uses - Breaking Down the Artificial Neural Network: Perceptrons -Activation Functions - Multilayer Perceptrons - Back Propagation - Data Preparation for Artificial Neural Networks - Artificial Neural Networks with Weka. Case Study: Convolutional Neural Networks (CNNs). Association Rule Learning: Usage of Association Rule Learning - Working of Association Rule Learning: Support - Confidence - Lift - Conviction - Defining the Process - Algorithms: Apriori - FP-Growth - Mining the Baskets - A Walk through.

Unit IV Discriminative Classifier and Clustering 9 h

Support Vector Machines: Definition of Support Vector Machine – Usages of Support Vector Machine – The Basic Classification Principles: Binary and Multiclass Classification – Liner Classifiers – Confidence – Maximizing and Minimizing to Find the Line – Approaches of Support Vector Machine Classification: Linear Classification – Non-Linear Classification – Using Support Vector Machines in Weka – Installing LibSVM – A Classification Walkthrough. Clustering: Definition of Support Vector Machine – Usage of Clustering – Clustering Models – K-Means Clustering with

10 h

10 h

Introduction to NLP: Text Analytics and NLP – Various Steps in NLP: Tokenization – PoS Tagging – Stop Word Removal – Text Normalization – Spelling Correction – Stemming – Lemmatization – NER – Word Sense Disambiguation – Sentence Boundary Detection – Kick Starting an NLP Project: Data Collection – Data Processing – Feature Extraction – Model Development – Model Assessment – Model Deployment. Basic Feature Extraction Method: Types of Data – Cleaning Text Data – Feature Extraction from Texts: Extracting General Features from Raw Text - Bag of Words – TF-IDF.

Text Books

- 1 Jason Bell, 2015, "Machine Learning Hands-on for Developers and Technical Professionals", 1st Edition, Wiley (Unit 1 to Unit 4).
- 2 Sohom Ghosh and Dwight Gunning, 2019, "Natural Language Processing Fundamentals", 1st Edition, Packt Publishing Ltd (Unit 5)

References

- **1** Suresh Samudrala, 2018, "Machine Intelligence: Demystifying Machine Learning, Neural Networks and Deep Learning", Notion Press.
- 2 Bhem Alpaydin, 2014,"Introduction to Machine Learning", 3rd Edition, The MIT Press, Cambridge.
- **3** Gavin Hackeling, 2014, "Mastering Machine Learning with Scikit-learn", Packt Publishing.



Course Code	Course Name	Category	L	T	Р	Credit
194CS2A3DB	SOFT COMPUTING	DSE	4	1	-	4

This course has been designed for students to learn and understand

- Understand the basic concepts of Soft Computing.
- In-depth learning of Neural Network concepts and Techniques.
- Enrich skills in the areas of Evolutionary Computing.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the fundamentals of Soft Computing.	K1
CO2	Review in Fuzzy Logic and Interference rules.	K2
CO3	Derive possibility Theory in Neural Networks.	K2
CO4	Develop Multi-Layered Feed Forward Neural Networks.	K3
CO5	Analyze the performance of Evolutionary Computing.	K4

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	М	М	М	S	М	
CO2	М	М	М	S	S	
CO3	М	М	М	М	S	
CO4	S	М	М	S	S	
CO5	S	S	S	М	М	
S Strong M Medium L Low						



SEMESTER III

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Soft Computing

Introduction: Hard Computing versus Soft Computing - Constituents of Soft Computing: Fuzzy Logic - Artificial Neural Networks - Evolutionary Computing -Machine Learning. Crisp and Fuzzy Sets - Classical or Crisp Set Theory: Basics Definition and Terminology - Operations - Properties of Crisp Sets - Crisp Relations and Operations: Basics Definition and Terminology - Operations -Composition of Crisp Relations - Fuzzy Sets Theory: Definitions and Terminologies - Operations on Fuzzy Sets - Fuzzy Relations - Composition of Fuzzy Relations -Types of Membership Functions - Features of Fuzzy Membership Functions.

Unit II Fuzzy Logic and Interference Rules

Classical Logic: Boolean Connectives - Propositional Logic - Predicate Logic -Multi-valued Logic: Three-valued Logic - n-Valued Logic. Fuzzy Logic: Fuzzy Predicate - The Linguistic Variable - Fuzzy Modifiers - Fuzzy Truth-values -Fuzzy Quantifiers - Fuzzy Propositions - Unconditional and Unqualified -Unconditional and Qualified - Conditional and Unqualified - Conditional and Qualified Proposition. Fuzzy Inference Systems: Fuzzification Process Interference (Implication) Process - Defuzzification Process - Types of Fuzzy Inference Engines: Mamdani Fuzzy Inference System - Sugeno Fuzzy Inference System - Tsukamoto Fuzzy Inference System - Neuro-Fuzzy System.

Unit III Rough Set, Possibility Theory and Neural Network 10 h

Rough Set: Rough Set with Approximation - Rough Set with Membership Function - Information System: Dependency of Attributes - Reduction of Attributes -Possibility Theory: Formalization of Possibility - Formalization of Necessity using Possibility. Single-Layer Feed-Forward Neural Network: Biological Neurons -Artificial Neural Network: Artificial Neuron Model - Artificial Neural Network Model: Neuron Model – Simple Perceptron – Perceptron Examples – Limitations of Perceptron - Single-layer Feed-forward Neural Network: Learning Process in Single-layer Feed-forward Network - Applications of Neural Networks.

Unit IV 10 h Multi-Layered Feed-Forward Neural Network

Multi-Layer Feed-Forward Neural Network (FFNN) Architecture: Processing at a Node. Learning Methods: Gradient Descent Learning - Backpropagation Method: Suckpropagation Training Algorithm - Weight Updation Method - Detailed 2015-2015-2015 arning Algorithm - Problems with weight Propagation dents Designur Assures 2015-201 Artificial Neural Network - Data Representation - Network Topology - Network

9 h

Parameters – Training Dataset. Hybrid Intelligent System: Neuro-fuzzy Systems: Fuzzy Systems – Neural Networks - Models of Neuro-fuzzy Systems: Categories of Neuro-fuzzy Systems –Hybrid Neuro-fuzzy System - Interpretation of Neuro-fuzzy System.

Unit V Evolutionary Computing

Evolutionary Algorithm – Swarm Intelligence - Paradigms of Evolutionary Computing: Genetics Algorithms – Genetic Programming (GP) - Evolutionary Strategies – Evolutionary Programming – Advantages of Evolutionary Computation. Genetic Algorithm Processes: Genetic Algorithm – Pseudo Algorithm for Genetic Algorithm - Selection of Parents. Swarm Intelligence: Overview – Particle Swarm Optimization: Functioning of Particle Swarm Optimization. Machine Learning: Machine-learning Systems – Supervised and Unsupervised Learning: Supervised Learning – Unsupervised Learning – Reinforcement Learning. Applications of Machine Learning.

Text Books

1 Saroj Kaushik, Sunita Tiwari, 2018, "Soft Computing: Fundamentals, Techniques and Applications", 1st Edition, Tata McGraw-Hill.

References

1 Charu C. Aggarwal, 2018, "Neural Networks and Deep Learning: A Textbook", Springer.

Rajasekaran. S and Vijayalakshmi Pai, 2017, "Neural Networks, Fuzzy Logic

- ² and Genetic Algorithms Synthesis and Application", 2nd Edition, Prentice Hall of India Pvt. Ltd.
- 3 Samir Roy and Udit Chakraborty, 2013, "Introduction to Soft Computing, Pearson".



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A3DC	DISTRIBUTED OPERATING SYSTEM	DSE	4	-	-	4

This course has been designed for students to learn and understand

- The fundamental concepts of Distributed Operating Systems.
- learn about Distributed Shared Memory Strategies.
- grasp knowledge in Resource Management.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of Message Passing System.	K2
CO2	Relate Interprocess Communication and Exception Handling Mechanism.	K2
CO3	Review the architecture and implementation of Shared Memory and Synchronization.	К3
CO4	Summarize the concepts of Resource management and Process management.	К3
CO5	Emphasis on Naming schemes and security approaches.	K4

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	S	М	М	М	L	
CO2	S	М	S	М	М	
CO3	М	S	М	М	М	
CO4	М	М	М	S	М	
CO5	М	M M S S		S	S	
S Strong M Medium L Low						



194CS2A3DC

SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction

Fundamentals: Definition of Distributed Computing System - Evolution -Definition of Distributed Operating System - Issues - Introduction to Distributed Computing Environment (DCE): Definition of DCE. Message Passing: Desirable Features of a Good Message Passing System - Synchronization - Buffering -Multidatagram Messages - Encoding and Decoding of Message Data - Process Addressing - Failure Handling.

Unit II Interprocess Communication

Remote Procedure Calls (RPCs): The RPC Model - Transparency of RPC -Implementing RPC Mechanism - Stub Generation - RPC Messages - Server Management - Parameter-Passing Semantics - Call Semantics - Communication Protocols for RPCs - Client-Server Binding - Exception Handling - Security - Some Special Types of RPCs - RPC in Heterogeneous Environments - Lightweight RPC -Optimizations for Better Performance.

Shared Memory and Synchronization 10 h Unit III

Distributed Shared Memory (DSM): General Architecture of DSM Systems - Design and Implementation Issues of DSM - Granularity - Structure of Shared Memory Space - Replacement Strategy - Thrashing - Other Approaches to DSM -DSM -Advantages of DSM. Synchronization: Heterogeneous Clock Synchronization: How Computer Clocks Are Implemented - Drifting of Clocks -Clock Synchronization Issues - Event Ordering - Mutual Exclusion - Deadlock.

Unit IV **Resource Management**

Resource Management - Desirable Features of a Good Global Scheduling Algorithm - Task Assignment Approach - Load Balancing Approach: A Taxonomy of Load Balancing Algorithms - Load Sharing Approach - Issues. Process Management: Process Migration: Features - Process Migration in Heterogeneous Systems -Advantages - Threads: Motivations for Using Threads - Models for Organizing Threads. Distributed File System: Features - File Models - File Accessing Models -File Sharing Semantics - File Caching Schemes: Cache Location - Modification Propagation - File Replication: Difference between Replication and Caching -Advantages - Replication Transparency – Fault Tolerance.



9 h

9 h

Naming: Features - Fundamental Terminologies and Concepts - System-Oriented Names - Object Locating Mechanism - Human Oriented Names: Human Oriented Hierarchical Naming Schemes - Names Caches: Types of name Caches - Naming and Security. Security: Potential Attacks to Computer Systems: Passive Attacks -Active Attacks - Cryptography: Basic concepts and Terminologies - Basic Requirements - Symmetric and Asymmetric Cryptosystem - Authentication: Approaches to Authentication - User Login Authentication - Access Control: Protection Domains - Digital Signatures - Design Principles. Case Study: A Comparison of Amoeba, V-System, Mach and Chorus.

Text Books

1 Pradeep K. Sinha, 2012, "Distributed Operating Systems: Concepts and Design", PHI Learning Private Limited.

- 1 Randy Chow, Theodore Johnson, 2009, "Distributed Operating Systems and Algorithm Analysis", 1st Edition, Pearson.
- 2 Andrew S. Tanenbaum, 2008, "Distributed Operating Systems",1st Edition, Pearson
- **3** Coulouris G., Dollimore J., and Kindberg T., 2001, "Distributed Systems: Concepts &Design", 3rd Edition, Addison-Wesley.



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Total Credit: 1

Syllabus

Unit I Intellectual Property and World Trade Organization (WTO)

Introduction: Definition of Intellectual Property - Introduction of WTO. Agreement on TRIPS (Trade Related Intellectual Property Rights): General Provisions and Basic Principles of TRIPS - Standards Concerning the Availability, Scope and Use of Intellectual Property Rights - Enforcement of Intellectual Property Rights -Acquisition and Maintenance of Intellectual Property Rights and Related Inter-Partes Procedures - Dispute Prevention and Settlement - Transitional Arrangements- Institutional Arrangements, Final Provisions

Unit II Patent

Fundamentals of Patent: Definition - History of the Patent in India - Conditions for Grant of Patent – Inventions those are not Patentable - Process and Product Patent -Procedure for Grant of Patent – e-Filing of Patent Application - Temporal and Spatial Aspect of Patent - Opposition to Grant of Patent - Rights of Patentee - Patent Office and Register of Patents - PCT Patent - Exclusive Marketing Rights -Milestones in Indian Patent Law. Transfer and Infringement of Patent Rights: Transfer of Patent Rights - Infringement of Patent Rights - Patent Challenges in Patent.

Unit III Copyright and Trade Marks

Copyright: Definition - Meaning of Publication - Copyright Office and Copyright Board - Ownership of Copyright - The Rights of the Owner - Term of Copyright -Registration of Copyright - Infringement of Copyright - Remedies against Copyright Infringement - Internet and Copyright Issue. Trade Marks: Definition -Developing a Trade Mark - Conditions for Trade Mark Registration - Register of Trade Marks - Trends in Trade Marks Applications - Procedure for Trade Mark Registration in India - Term of Trade Mark - Certification Trade Mark -Infringement of Trade Mark - Remedies against Trade Mark Infringement.

Unit IV Significance of Entrepreneur

Basic Business Concepts for the Prospective Entrepreneur: Production Factors as Resources Needed When Starting an Enterprise - The Enterprise, Its Establishment and The Sectors- Profit and Other Objectives of an Entrepreneur - Informal and Formal Enterprises - Form of Enterprise for A Small Business - The Business Environment. Entrepreneurship and Entrepreneurial Skills: Definitions of an Entrepreneur - The Relationship between Entrepreneurship and Small Business Management - Key Characteristics of Successful Entrepreneurs - Entrepreneurial



Unit V Ideas for Start-up

The Identification of Feasible Small Business Ideas: Introduction - Cultivating a Creative Attitude - Generating Small Business Ideas: The Generation of Ideas from the Entrepreneur's Skills, Expertise and Aptitudes – Common Needs – Existing Problems – Everyday Activities – Other Sources - The Development and Evaluation of Small Business Ideas. The Business Plan: About the Business Plan – Contents of the Business Plan - The Entrepreneurial Team – Description of the Enterprise – The Objective and Strategy of the Enterprise.

Text Books

- 1 Neeraj Pandey, Khushdeep Dharani, 2014, "Intellectual Property Rights", PHI Learning Pvt. Ltd.
- 2 Nieuwenhuizen C, 2015, "Basics of Entrepreneurship", Juta Pvt. Ltd.

- 1 Deborah. E. Bouchoux, 2018, "Intellectual Property Right" 5th edition, Cengage Learning.
- 2 Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, 2018, "Entrepreneurship", 10th Edition, Tata McGraw Hill.
- 3 Prabuddha Ganguli, 2008, "Intellectual Property Right", 1st Edition, Tata McGraw Hill.



SEMESTER III

Total Credits: 1

Syllabus

Unit I Nature and Scope of Organisation

Introduction – Concept of Organisation – Features – Types – Concepts of Organisational Typology and its Types – Significance of Organisation – Organisational Goals – Importance – Goal Formulation – Nature of Goals – Goal Changes – Individual and Organisational Goals – Conflict between Individual and Organisational Goals – Nature of Business Organization – Organisation Theory.

Unit II Organisational Behaviour]

PConcept and Meaning of Organisational Behaviour (OB) – Characteristics of OB – Key Elements / Forces of OB - Goal of OB – Philosophical Concepts of OB – Fundamental Concepts of OB – OB and Other Fields of Study – Role of OB – Historical Evolution of OB – Approaches to the Study of OB – Models of OB – Challenges and Opportunities of OB.

Unit III Individual Behaviour and Personality

Personal Factors - Environmental Factors - Organisational Factors - Models of Man / Individual Behaviour. Personality: The Meaning of Personality - Characteristics of Personality - Determinants of Personality - Development of Personality -Personality Traits - Major Traits Influencing Organisational Behaviour - Locus of Control - Matching Personality with Job Types.

Unit IV Group Functionalities

Definition of Groups – Types of Groups – Theories of Group Formation – Reasons for Group Formation – Factors Affecting Group Performance – Inter-Group Behaviour – Approaches to Inter-Group Relationship – Group Dynamic A Synoptic View. Group Decision Making: Meaning – Nature – Groups – Process – Steps – Styles – Advantages and Disadvantages.

Unit V Communication and Leadership

Communication: Definitions – Characteristics: Nature of Communication – Elements – Process – Models – Need or Purpose – Importance – Methods (Channels) – Inter Personal – Cross Cultural Communication. Leadership: Definitions – Nature and Characteristics - Leadership Vs Management – Leadership Styles - Formal and Informal Leaders – Leadership Functions – Importance of Leadership in Management – Process or Techniques of Effective Leadership.

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Text Books

1 Shashi K Gopta, Rosy Joshi, 2014, "Organisational Behaviour", 9th Edition, Kalyani Publishers.

- 1 Khanka S.S., 2013, "Organisational Behaviour". 7th edition, Sultan Chand & Sons Publishing.
- 2 Stephen P. Robins, 2008, "Organizational Behavior", 11th edition, PHI Learning / Pearson Education, ,
- ³ Fred Luthans, 2010, "Organisational Behavior", 11th Edition, McGraw Hill.



Course Code	Course	Course Name	т	тТ		Exam	Ma	Credits		
Course Coue	Category	Course Name	L	1	ľ	(h)	CIA	ESE	Total	Cleans
Fourth Semester	Fourth Semester									
Part – III										
194CS2A4CA	Core- XII	Android Programming	4	1	0	3	25	75	100	4
194CS2A4CB	Core-XIII	Web Intelligence	4	0	0	3	25	75	100	4
194CS2A4CP	Core Practical -VII	Android Programming	0	0	5	3	40	60	100	2
194CS2A4VA	Core-XIV	Core Project	0	0	16	3	40	60	100	8
Total 8 1 21 400 18										



Course Code	Course Name	Category	L	Т	Р	Credit
194CS2A4CA	ANDROID PROGRAMMING	CORE	4	1	0	4

This course has been designed for students to learn and understand

- Develop mobile applications using Android SDK
- Experiment with database to store and view data
- Demonstrate Location Based Services using Google Maps

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Ability to perform installation and configuration of Android application development tools	K2
CO2	Understand the fundamental building blocks of Android application	K2
CO3	Design and develop User Interfaces for the Android platform	К3
CO4	Explore views, pictures and menus in android application	K3
CO5	Apply techniques to store, retrieve data using SQLite database and demonstrate to build location based services	К3

COs/POs	PO1	PO2	PO3	PO4	PO5	
CO1	S	М	L	S	М	
CO2	L	S	L	S	S	
CO3	L	L	М	S	S	
CO4	М	L	S	М	S	
CO5	S M		М	S	S	
S Strong M Medium L Low						



12 h

SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit IIntroduction to Android Programming12 h

Getting started with Android Programming: Definition of Android – Android Versions – Features of Android – Architecture of Android – Android Devices in the Market – Obtaining the Required Tools: Android Studio – Android SDK – Creating Android Virtual Devices (AVDs) – Launching your First Android Application. Using Android Studio for Android Development: Exploring the IDE – Using Code Completion – Debugging your Application: Setting Breakpoints – Navigating Paused Code – Publishing your Application.

Unit II Activities, Fragments and Intents

Understanding Activities: Applying Styles and Themes to an Activity – Hiding the Activity Title – Displaying a Dialog Window – Displaying a Progress Dialog – Linking Activities using Intents: Returning results from Intent – Passing Data Using an Intent Object – Fragments: Adding Fragments Dynamically – Life cycle of a Fragment – Interaction between Fragments – Understanding the Intent Object – Using Intent Filters – Displaying Notifications.

Unit IIIAndroid User Interface (UI)12 h

Getting to Know the Android UI:Understanding the Components of a Screen: Views and View Groups – Frame Layout – Linear layout – Table Layout – Relative Layout – Frame Layout – Scroll View – Adapting to Display Orientation– Managing Changes to Screen orientation: Persisting State Information During Changes in Configuration – Detecting Orientation Changes – Controlling the Orientation of the Activity – Utilizing the Action Bar: Adding Action Items to the Action Bar – Creating the User Interface Programmatically – Listening for UI Notifications.

Unit IV Designing UI, Displaying Picture and Menus 12 h

Designing Your User Interface with Views: Using Basic Views: TextView View -Button, ImageButton, EditText, CheckBox, ToggleButton, RadioButton, and RadioGroup Views -ProgressBar View – AutoCompleteTextView View–Using Picker Views - Using List Views to Display Long Lists – Understanding Specialized Fragments. Displaying Pictures and Menus with Views: Using Image Views to Display Pictures:ImageView View – ImageSwitcher – GridView – Using Menus



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with Views – Creating the Helper Methods – Options Menu – Context Menu – Using WebView.

Unit VData Persistence and Location Based Services12 h

Data Persistence: Saving and Loading User Preferences: Accessing Preferences Using an Activity – Programmatically Retrieving and Modifying the Preference Values – Persisting Data to Files: Saving to Internal Storage - Saving to External Storage (SD Card) – Choosing the best Storage Option – Creating and Using Databases: Creating the DBAdapter Helper Class – Using the Database Programmatically. Location Based Services: Displaying Maps – Getting Location Data – Monitoring a location.

Text Books

- 1 J. F. DiMarzio, 2016, "Beginning Android Programming with Android Studio", 4th Edition, John Wiley & Sons.
- 2 Reto Meier, 2012, "Professional Android 4 Application Development", 3rd Edition, Wiley.

- 1 B.M Harwani, 2013, "Android Programming", 1stEdition, Pearson Education
- 2 ZiguradMednieks, LaridDornin, G.BlakeMeike, Masumi Nakamura, 2013, "Programming Android", 2nd Edition, O'Reilly.
- 3 John Horton , "Android Programming for Beginners", 2nd Edition, Packt Publishing.
- 4 Ian G. Clifton, "Android user Interface Design Turning Ideas and Sketches into Beautifully Designed Apps", 1st Edition, Addison Wesley.



Course Code	Course Name	Category	L	Т	P	Credit
194CS2A4CB	WEB INTELLIGENCE	CORE	4	0	0	4

This course has been designed for students to learn and understand

- Enable the students to understand the Web Mining concepts.
- Provide adequate knowledge on Web Search and Web Structure mining.
- Learn about Emotion AI and Web Usage Mining.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Providing knowledge on the basic concepts of web mining.	K2
CO2	Ability to understand the Web Search and Web Crawling methods	K2
CO3	Use different concepts on Web Structure Mining and Social Network Analysis	К3
CO4	Learn about the Opinion Mining and Sentiment Analysis	K3
CO5	Apply the concept of Web Usage Mining	K3

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	М	L	М
CO2	М	S	L	М	S
CO3	S	L	М	L	S
CO4	М	S	L	М	L
CO5	L	S	S	L	L
S Strong		M Med	ium	L Low	



SEMESTER IV

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of Web Mining

Introduction: Definition of World Wide Web - A Brief History of the Web and the Internet -Web Data Mining: Definition of Data Mining - Definition of Web Mining. Web Mining: Information Retrieval and Web Search: Basic Concepts of Information Retrieval - Information Retrieval Models: Boolean Model - Vector Space Model -Statistical Language Model - Evaluation Measures - Text and Web Page Pre-Processing: Stopword Removal -Stemming - Other Pre-Processing Tasks for Text -Web Page Pre-Processing - Duplicate Detection - Inverted Index and its Compression: Inverted Index - Search Using an Inverted Index - Index Construction - Index Compression: Unary Coding.

Unit IIInformation Retrieval and Web Crawling9 h

Information Retrieval and Web Search: Web Search - Meta-Search and Combining Multiple Rankings: Combination Using Similarity Scores - Combination Using Rank Positions - Web Spamming: Content Spamming - Link Spamming - Hiding Techniques - Combating Spam. Web Crawling: A Basic Crawler Algorithm: Breadth-First Crawlers - Preferential Crawlers - Implementation Issues: Fetching – Parsing - Stopword Removal and Stemming - Link Extraction and Canonicalization - Spider Traps - Page Repository – Concurrency - Universal Crawlers: Scalability -Coverage vs. Freshness vs. Importance - Focused Crawlers - Topical Crawlers: Topical locality and Cues.

Unit III Web Structure Mining and Social Network Analysis 10 h

Structured Data Extraction: Wrapper Generation: Preliminaries: Two Types of Data Rich Pages - Data Model - HTML Mark-up Encoding of Data Instances - Wrapper Induction: Extraction from a Page - Learning Extraction Rules - Identifying Informative Examples - Wrapper Maintenance - Building DOM Trees - Extraction Based on a Single List Page: Flat Data Records. Social Network Analysis: Centrality - Prestige - Co-Citation and Bibliographic Coupling - PageRank: Algorithm -Strengths and Weaknesses of PageRank - HITS: HITS Algorithm - Finding Other Eigenvectors - Relationships with Co-Citation and Bibliographic Coupling -Strengths and Weaknesses of HITS.

Unit IV Emotion AI

10 h



Opinion Mining and Sentiment Analysis: The Problem of Opinion Mining: Problem Definitions – Aspect-Based Opinion Summary - Document Sentiment Classification: Supervised Learning - Un-Supervised Learning - Sentence Subjectivity and Sentiment Classification - Opinion Lexicon Expansion - Aspect-Based Opinion Mining: Aspect Sentiment Classification – Basic Rules of Opinions - Aspect Extraction - Opinion Search and Retrieval - Opinion Spam Detection: Types of Spam and Spammers - Hiding Techniques - Spam Detection based on Abnormal Behaviors - Group Spam Detection - Utility of Reviews.

Unit VWeb Usage Mining (WUM)10 h

WUM: Data Collection and Pre-Processing - Sources and Types of Data - Key Elements of Web Usage Data Pre-Processing - Data Modeling for Web Usage Mining - Discovering and Analysis of Web Usage Patterns: Session and Visitor Analysis - Cluster Analysis and Visitor Segmentation - Association and Correlation Analysis - Analysis of Sequential and Navigational Patterns - Classification and Prediction based on Web User Transactions. Query Log Mining: Data Sources, Characteristics and Challenges - Query Log Data Preparation - Query Log Data Models - Query Log Feature Extraction.

Text Books

1 Bing Liu, 2011 ,"Web Data Mining Exploring Hyperlinks, Contents, and Usage Data", 2nd Edition, Springer

- Ricardo Baeza -Yates and Berthier Ribeiro-Neto, 2011, "Modern Information
 Retrieval: The Concepts and Technology behind Search", 2nd Edition, ACM Press Books.
- 2 Juan D.VelásquezLakhmi C. Jain (Eds.), 2010, "Advanced Techniques in Web Intelligence - 1 ", 1st Edition, Springer
- 3 Mark Levene, 2010, "An Introduction to Search Engines and Web Navigation", 2nd Edition, Wiley



CORE PRACTICAL : ANDROID PROGRAMMING

Total Credits:2Total Instructions Hours:48 h

S.No

List of Experiments

- **1** Create an android application to create Login Page.
- 2 Create an android application to perform onClick, onKeyDown, onFocusChanged Event Handlers.
- 3 Create an android application to link activities using intents for a quiz application.
- 4 Create an android application to display notification for a meeting reminder.
- 5 Demonstrate calculator application using Table layout.
- 6 Create an android application to add search icon in action bar that performs search on listed book details.
- 7 Develop an android application that uses GUI components, Font and Colors.
- 8 Create an android application with Multiple Activities and a Simple Menu using ListView
- **9** Create an android application to display a catalogue of pictures for an e-commerce application.
- **10** Build an android application with android's advanced User Interface functions to obtain student feedback.
- **11** Create an android application to perform Data Storage and Retrieval operations from the external storage for an event registration.
- 12 Create an android application that displays current GPS location information.

Note: Any 10 experiments are mandatory



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PREAMBLE

• Enable to enhance their skills for software development.

PROJECT AND VIVA VOCE:

Each Student in the M.Sc CS Final Year must compulsorily undergo Project work in the 4th SEMESTER. Projects shall be done on Individual Basis. The Project Coordinator will allocate the project Guide for each student. The Project Work should be done inside the campus. Three Project Reviews will be conducted in which the Progress of Project work will be strictly evaluated by Respective Project Guide. Viva Voce will be conducted only in the presence of Industrialists or Academicians.

In the total of 100 Marks, 40% of marks are allocated for CA and 60% for CE Viva Voce.

Following guidelines are hereby enlisted for all the students based on the necessity and importance of the project

Basic framework

The stages in Project Work are given below:

- The student has to select a project in a related field of Computer Science / Information Technology.
- Students can opt various types of organizations for their major project as intern. But before the training actually starts, profile of the organization must be submitted for evaluating the various parameters of the company like *Turnover of the organization*, *No. of employees and Location of the organization(Major Project Only)*
- After obtaining the approval from project guide, the student has to carry out the project work.


Student has to maintain the **project work diary**. The Project Work carried out should be in accordance with the approved project proposal

- All communication must be in writing. No verbal communication will be accepted.
- Student should adhere to the timings for submission of various reports as mentioned in the guidelines. No excuse will be entertained in any case.
- Student should prepare a Project Report at the end of his/her work, which his /her supervisor would certify and approve for submission (the Project Report should conform to the Standard Format laid down for Project Report).
- The student should submit the Project Report to the college.

Guide for the Project:

- Project guide will be allotted by the Department to each student
- Each student will be working under a Project Guide for the project to be done.
- Student must report to his/her project guide regularly.

The student can also have a guide who could be the person under whose supervision the student is doing the project in the industry

Selection of Project:

- The selection of the project can be done in consultation with the project guide.
- Group of the students are not allowed to do a single project at a time.

It is possible that a group of student is doing different modules of the same project. In such cases, the student is required to do 3-5 modules of the large project

Submission of Project Report:



- The student will submit his/her project report in the prescribed format.
- Project Report will be submitted in triplicate (Hard Bound Copies) with the proper certification by the organization concerned in the specified format and color. None of copies of the project report will be returned to the student.
- The project reports along with a CD should be submitted to the HoD/Supervisor / Controller of examinations twenty days prior to the final semester examination.

A certificate from the supervisor should also be enclosed in the Project Report as provided in the format for project report.

Fields for Project:

- GUI Tools (Front End) Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000,VC++, Jbuilder
- **RDBMS(Back End)** Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
- Languages C, C++, Java, VC++, C#, Python, R.
- Scripting Languages PERL, SHELL Scripts (Unix), TcL/TK, PHP
- .NET Platform Dya log APL, VB.Net, C#.Net, Visual C#.Net, Net, ASP.Net, Delphi
- Middle Ware (Component) Technologies COM/DCOM, Active-X, EJB, WINCE, MSMQ, BEA, Message Q, MTS, CICS
- Unix Internals Device Drivers, RPC, Threads, Socket programming
- Architectural Concepts CORBA, TUXEDO, MQ SERIES



- Internet Technologies DHTML, Java script, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Servlets, Visual Age for JAVA, UML, VRML, WML, Vignette, EDA, Broad vision, Ariba, iPlanet, ATG, Big Talk, CSS, XSL, Oracle ASP server, AWT, J2EE, LDAP, ColdFusion, Haskell 98
- Wireless Technologies Blue Tooth, 3G, ISDN, EDGE
- Real time Operating System/ Embedded Skills QNX, LINUX, OSEK, DSP, VRTX, RTXC, Nucleus
- Operating Systems WINDOWS 2000/ME, WINDOWS NT, WINDOWS XP, UNIX, LINUX, IRIX, SUN SOLARIS, HP/UX, PSOS, VxWorks, AS400, AIX, DOS, Android.
- Application Areas Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication Software development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming.

Students can also develop applications using tools/languages/software not listed above, if they are part of latest technologies

Phases of Training Period

- At the time of Review I, students should present Title, Synopsis/Abstract of the project and Module Description.
- Students should present the Mid Term Report at the time of Review II.



- Students should present the Development and Testing Report at the time of Review III.
- Students should submit the complete Project Report at the time of Model Viva-Voce./

The external Viva-Voce will be conducted for all the students.

Formatting of Project:

- The whole project report should be nicely composed and presented.
- The dimension of the project report should be in A4 size only.
- Page Specification : (Written paper and source code) Left margin - 3.0 cms/1.18 inches Right margin- 2.0 cms/0.78 inches Top margin 2.54 cms/1 inch Bottom margin 2.54 cms/1 inch
- The project report should be typed in good word processor and should avoid spellings and grammatical mistakes.
- The impression on the typed copies should be black in color.
 Normal Body Text: Font Size: 12, Times New Roman, 1.5 lines Spacing, Justified.

Paragraph Heading Font Size: 14, Times New Roman, Left Aligned. 12 points above & below spacing

Chapter Heading Font Size: 16, Times New Roman, Centre Aligned, 30 points above and below spacing.

Coding Font size: 10, Courier New, Normal

- Students should use only one side of paper for printing.
- Page numbers All text pages as well as Program source code listing should be numbered at the bottom center of the page.



Cover Page - Attractive and appealing cover page containing the Project Title, program details, Student & Guide details, month of submission etc.

COLOR - Cover Page Color is silver Gray

Letter of Authentication - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same project ever before. Students are advised not to **COPY** the project report from other students.

Authorization from Organization where such Project have been implemented with certificate showing the student name, register number and project name.

Certificate from Project Guide - Certificate from the Project Guide certifying the project work done under his/her guidance along with course, student, and project details complete in all respects.

Draft of Project Report

The size of the project report can be approximately **130 - 150** pages, which include the following details:

Certificate of the project guide

Certificate of the Organization

Acknowledgement

Synopsis / Abstract

Table of Contents

1 Introduction

1.1 About Organization

- 1.2 Problem Definition
- 1.3 System Configuration
 - 1.3.1 Hardware configuration
 - 1.3.2 Software configuration

2 System Study



- 2.1 Existing System with limitations
- 2.2Proposed System with objectives
- 2.3 Problem description

3 System Design & Development

- 3.1 System Flow Diagrams / Control Flow Diagrams
- 3.2 E-R Diagrams / Use Case Diagrams
- 3.3 Data Flow Diagram / Activity Diagrams
- 3.4 Input Design
- 3.5 File / Database Design
- 3.6 Output design (includes Report Design)
- 3.7 User Interface Design (if Needed)

4 System Testing

- 4.1. Unit Testing
- 4.2. Integration Testing
- 4.3. System Testing

5. System Implementation and Maintenance

- 5.1. System Security Measures
- 6.Conclusion
 - 6.1. Scope for Future Prospects

Bibliography and Web References

Appendices

- Forms (input screen shots)
- Sample Source Code
- Output Screen shots
- Reports
- Sample Coding / Abstract Coding
- Along with it, if the student feels to add on any other topics as per the demand of the project or want to include the functionalities as



per the SDLC(Software Development Life Cycle) or the Software Engineering model used, that can be done and included in the Project Report.

The project report must include all the components as per the SDLC. It is highly recommended to follow the approaches of Software Engineering methodology.

Arrangement of Contents

- Cover Page & Title Page
- Bonafide Certificate
- Synopsis / Abstract
- Table of Contents
- Chapters
- List of Tables
- List of Figures
- List of Symbols, Abbreviations and Nomenclature
- Appendices
- References

The table and figures shall be introduced in the appropriate places

- List of Symbols, Abbreviations and Nomenclature One and a half spacing should be adopted for typing the matter under this head. Standard symbols, abbreviations etc. should be used.
- **Chapters** The chapters may be broadly divided into 3 parts. Introductory chapter, Chapters developing the main theme of the project work and Conclusion.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and subdivisions.



- Each chapter should be given an appropriate title.
- Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- Footnotes should be used sparingly. They should be typed with single space and placed directly underneath in the very same page, which refers to the material they annotate.
- **Appendices** Appendices are provided to give supplementary information, which is included in the main text as they may serve as a distraction and cloud the central theme.
 - Appendices should be numbered using Arabic numerals.
 - Appendices, Tables and References appearing in appendices should be numbered and referred to an appropriate place just as in the case of chapters.
 - Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.
- List of References The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing and left justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

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