

**LEARNING OUTCOMES- BASED CURRICULUM**

**FRAMEWORK (LOCF)**

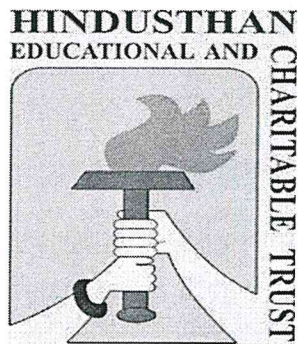
**in the**

**POSTGRADUATE PROGRAMME**

**M.Sc. Computer Science**

**FOR THE STUDENTS ADMITTED FROM THE**

**ACADEMIC YEAR 2020 - 2021 AND ONWARDS**



**HICAS**

**HINDUSTHAN COLLEGE OF ARTS AND SCIENCE**

**(AUTONOMOUS)**

**(Affiliated to Bharathiar University and Accredited by**

**NAAC) COIMBATORE-641028**

**TAMILNADU, INDIA.**

Phone: 0422-4440555

Website: [www.hindusthan.net/hicas/](http://www.hindusthan.net/hicas/)

**HINDUSTHAN COLLEGE OF ARTS AND SCIENCE  
DEPARTMENT OF COMPUTER SCIENCE**

**PREAMBLE**

**Learning Outcomes-Based Curriculum Framework(LOCF) in the Postgraduate  
Programme M.Sc Computer Science**

**VISION**

To cater the needs of industrial development innovation to be among the nation's premier research and teaching programs in Computing Informatics with leadership and recognition in identified focus areas.

**MISSION**

To develop independent thinkers who can provide leadership in the computing industry or academia, as well as deep insights with a broad perspective on the established and emerging fields of computing.

**Programme Educational Objectives (PEO)**

Post Graduates of Computer Science program will be

**PEO1:** Implement domain knowledge of core technologies and deliver professional services in career by incorporating creativity in computing profession.

**PEO2:** Explore leadership skills and incorporate ethics as an entrepreneurship to inculcate problem solving capability, design skills and other diverse career paths.

**PEO3:** Expose Knowledge to various contemporary issues which will enable to become ethical and responsible towards themselves as a co-worker for society and the nation.



**PROGRAM OUTCOME (PO):**

**PO1:** Ability to apply the knowledge of Mathematics, science and engineering to the complex problems applicable to the discipline.

**PO 2:** Ability to analyze, design, develop and evaluate computer based system, process or program to meet the desired solutions.

**PO 3:** Ability to apply research based knowledge and methodologies in software based project development using innovative ideas and open ended programming tools to deliver a quality product for business success.

**PO 4:** Ability to realize Professional and ethical responsibility and act in accordance to social welfare.

**PO 5 :** Ability to engage in life-long learning to acquire knowledge of contemporary issues to face the career challenges.

**PROGRAM SPECIFIC OUTCOME (PSO):**

**PSO 1:** Attain the ability to design and develop hardware and software based systems ,evaluate and recognize potential risk and provide creative solutions.

**PSO 2:** Gain knowledge in diverse area of computer science and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.

**PSO3:** Explore technical knowledge in the field of computing and in latest trends, to pursue teaching research and development activities to work effectively in a team.

**HINDUSTHAN COLLEGE OF ARTS AND SCIENCE  
(AUTONOMOUS)  
COIMBATORE-641028  
SCHEME OF EXAMINATIONS - CBCS & LOCF PATTERN**

*(For the students admitted from the Academic year 2020-2021 and onwards)*

**PG PROGRAMME**

**Programme: M.Sc Computer Science**

Course code	Course Type	Course Title	Lecture Hours/ Week	Exam Duration (Hours)	I.E	E.E	Total	Credit Points
<b>Semester – I</b>								
20CEP01	DSC	Mobile Application Development	5	3	30	70	100	5
20CEP02	DSC	Analysis & Design of Algorithms	5	3	30	70	100	4
20CEP03	DSC	Advanced Java Programming	5	3	30	70	100	5
20CEP04	DSC	Advanced Software Engineering	5	3	30	70	100	4
20CEP05	DSC	<b>Practical I:</b> Mobile Application Programming	5	3	40	60	100	3
20CEP06	DSC	<b>Practical II:</b> Java Programming	5	3	40	60	100	3
20CEPV01	ACC	VAC-I	2	1	50	-	50	1
20CEPJ01	SEC	Aptitude / Placement Training	2	1	50	-	50	Grade*
20CEPV02	SEC	Online Classes	2	1	-	-	-	Grade*
<b>Semester – II</b>								
20CEP07	DSC	Advanced Operating System	5	3	30	70	100	4
20CEP08	DSC	Open source Database Management system	5	3	30	70	100	5
20CEP09	DSC	Web Programming Using Open Source Technologies	5	3	30	70	100	5
20CEP10	DSC	Machine Learning & Robotics	4	3	30	70	100	4
20CEP11	DSC	<b>Practical III:</b> Open source Database management system	4	3	40	60	100	2
20CEP12	DSC	<b>Practical IV:</b> Web Programming	5	3	40	60	100	3
20GSP01	AECC	Skill based subject: Cyber security	2	2	100	--	100	2
20CEPV02	ACC	VAC-II	2	1	50	-	50	1
20CEPJ03	SEC	Aptitude / Placement Training	2	1	50	-	50	Grade*
20CEPJ04	SEC	Online Classes	2	1	-	-	-	Grade*

**Semester – III**

20CEP13	DSC	Digital Image Processing	5	3	30	70	100	5
20CEP14	DSC	Data Mining & Warehousing	5	3	30	70	100	5
20CEP15	DSC	Internet of Things	5	3	30	70	100	5
20CEP16	DSC	<b>Practical V: DIP</b> Programming using MAT LAB	5	3	40	60	100	3
20CEP17	DSC	<b>Practical VI : Programming</b> the Internet of Things Lab	5	3	40	60	100	3
20CEP18A	DSE	<b>Elective - I</b> (A)Distributed Computing	5	3	30	70	100	3
20CEP18B		<b>Elective – I</b> (B)Web Technology						
20CEP18C		<b>Elective – I</b> (C)Data Analytics						
20CEPV03	ACC	<b>VAC-III</b>	2	1	50	-	50	1
20CEPJ05	SEC	<b>Aptitude / Placement</b> <b>Training</b>	2	1	50	-	-	Grade*
20CEPJ06	SEC	<b>Online Classes</b>	2	1	-	-	-	Grade*

**Semester – IV**

20CEP19	DSC	Big Data Analytics	5	3	30	70	100	4
20CEP20	DSC	Research Methodology	5	3	30	70	100	5
20CEP21	DSC	<b>Practical VII : Big Data</b> Analytics Using R Tool	5	3	40	60	100	3
20CEP22A	DSE	<b>ELECTIVE II</b> A) Business Intelligence	5	3	30	70	100	3
20CEP22B		<b>ELECTIVE II</b> B)E-Commerce						
20CEP22C		<b>ELECTIVE II</b> C) Software Testing						
20CEP23	DSC	Project Work	-	-	50	150	200	3
20CEPV04	ACC	<b>VAC-IV</b>	2	1	50	-	50	1
20CEPJ07	SEC	<b>Aptitude / Placement</b> <b>Training</b>	2	1	50	-	-	Grade*
20CEPJ08	SEC	<b>Online Classes</b>	2	1	-	-	-	Grade*
<b>TOTAL CREDIT</b>								95



- **VAC**-Value Added Course (Extra Credit Courses)
- **JOC**- Job Oriented course
- **I.E**-Internal Exam
- **E.E**-External Exam

\* Grades depends on the marks obtained

Range of marks	Equivalent remarks
80 and above	Exemplary
70 – 79	Very good
	Good
50 – 59	Fair
40 – 49	Satisfactory
Below 39	Not Satisfactory = Not Completed

#### **PASSING MINIMUM**

- Passing Minimum for UG 40% and for PG 50 %
- For UG : 35 % (25 marks) in EE and 40 % in Total Marks
- For PG 50 % (35 marks) in EE and 50 in Total Marks

<b>List of Open Elective Papers</b>	
Open Electives	Courses offered by the Departments (Additional credit Course)
	a) Digital Marketing
	b) SAP ERP Fundamentals
	c) Digital Humanities
	d) Master Web Designing in Photoshop
	e) Cyber law
	f) Web Services

<b>List of Elective Papers/ DSE</b> (Can choose any one of the paper as electives)		
	Course Code	Title
Electives/ <b>DSE-I</b>	20CEP18A	<b>Elective - I</b> (A)Distributed Computing
	20CEP18B	<b>Elective – I</b> (B)Web Technology
	20CEP18C	<b>Elective – I</b> (C)Data Analytics
Electives/ <b>DSE-II</b>	20CEP22A	<b>ELECTIVE II</b> A) Business Intelligence
	20CEP22B	<b>ELECTIVE II</b> B)E-Commerce
	20CEP22C	<b>ELECTIVE II</b> C) Software Testing



## ABSTRACT FOR SCHEME OF EXAMINATIONS

(For the Candidates admitted during the academic year 2020 - 2021 and onwards)

S.No.	Course (AEE/DSC/DSE/GE/ACC/SEC)	Papers	Credit	Total Credits	Marks	Total Marks
1	DSC	8	5	40	100	800
	DSC	5	4	20	100	500
	DSC	7	3	18	100	700
	DSC	1	2	2	100	100
2	DSE	2	3	6	100	200
3	AECC	1	2	2	100	100
	SEC(Aptitude/Placement training)	4	GRADE			
5	SEC(online Classes)	4	GRADE			
6	ACC	4	1	4	50	200
	<b>Total</b>	<b>36</b>	<b>20</b>	<b>95</b>	<b>700</b>	<b>2600</b>

\* Actual credit point :91

\* Extra Credit Point:4

### PG Courses- Scheme of Evaluation (Internal & External Components)

(For the students admitted during the academic year 2020-2021 and onwards)

#### 1. Internal Marks for all PG

Components	Marks
Test	5
Model Exam	10
Assignment	5
Attendance*	5
Seminar	5#
<b>TOTAL</b>	<b>30</b>

#### \*Split-up of Attendance Marks for UG

- \* 75-79 - 1 marks
- \* 80-84 - 2 marks
- \* 85-89 - 3 marks
- \* 90-94 - 4 marks
- \* 95-100 - 5 marks

(# (3+2)-3 for External & 2 for (Internal paper presentation or poster design)

#### 2. a) Components for Practical I.E.

Components	Marks
Test -I	20
Test - II	20
<b>Total</b>	<b>40</b>

#### b) Components for Practical E.E.

Components	Marks
Experiments	50
Record	5
Viva	5
<b>Total</b>	<b>60</b>

#### 3. Institutional/ Industrial Training, Mini Project and Major Project Work

Institutional /Industrial Training (I.E)		Mini Project (I.E)	Major Project Work		
Component	Marks	Marks	Component	Marks	Total Marks
Work diary	25	-	I.E a)Attendance	20	50
Report	50	50	b)Review	30	
Viva-voce	25	50			
<b>Total</b>	<b>100</b>	<b>100</b>	E.E* a) Final report	120	150
			b)Viva-voce	30	
<b>Total</b>					<b>200</b>

\*Evaluation of report and conduct of viva voce will be done jointly by Internal and External Examiners

#### 4. Components for Cyber Security Paper

Components	Marks
Two Tests (each 2 hours) of 40marks each [4 out of 7 descriptive type questions 4 x 10 = 40 Marks]	80
Two assignments (2 x 10)	20

#### 5. Value Added Courses and Aptitude/Placement courses:

Components	Marks
Two Test (each 1 hour) of 25 marks each QP is objective pattern (25x1=25)	50
<b>Total</b>	<b>50</b>

#### Guidelines:

1. The passing minimum for these items should be 50%
2. If the candidate fails to secure 50% passing minimum, he / she may have to reappear for the same in the subsequent semesters
3. Item No's:4,5, are to be treated as 100% Internal papers.
4. For item No.5, Tests conducted through online modules (Google Form/any other)

**PG PATTERN**

**QUESTION PAPER PATTERN FOR CIA EXAM**

Reg.No: \_\_\_\_\_

Q.P.CODE:

**HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)**

\_\_\_\_\_ DEGREE CIA EXAMINATIONS \_\_\_\_\_20\_\_\_\_\_

(\_\_\_\_\_Semester)

BRANCH: \_\_\_\_\_

Subject Name: \_\_\_\_\_

Time: Two Hours

Maximum: 50 Marks

**Section-A (3 x 6=18 Marks)**

Answer ALL Questions

ALL questions carry EQUAL Marks

(Q.No: 1 to 3 Either Or type)

**Section-B (4 x 8=32 Marks)**

Answer ALL Questions

ALL questions carry EQUAL Marks

(Q.No: 4 to 7 Either Or type)

**QUESTION PAPER PATTERN FOR MODEL/ END SEMESTER EXAM**

Reg.No: \_\_\_\_\_

Q.P.CODE:

**HINDUSTHAN COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)**

\_\_\_\_\_ DEGREE MODEL EXAMINATIONS \_\_\_\_\_20\_\_\_\_\_

(\_\_\_\_\_Semester)

BRANCH: \_\_\_\_\_

Subject Name: \_\_\_\_\_

Time: Three Hours

Maximum: 70 Marks

**SECTION - A (5x6=30 marks)**

Answer ALL Questions

ALL Questions carry EQUAL Marks

(Q.No 1 to 5 Either Or type)

(One question from each Unit)

**SECTION - B (5x8=40 Marks)**

Answer ALL Questions

ALL Questions carry EQUAL Marks

(Q.No 6 to 10 Either Or type)

(One question from each Unit)

<b>Course Code:</b>	<b>20CEP01</b>	<b>Mobile Application Development</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>I</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>5</b>

### **COURSE OBJECTIVE**

- Apply the fundamental concepts of Android studio and other application
- Explore Life cycle of an application in Android
- Design to create a new application in Mobile environment.
- Develop Debug and Deploy Android applications to Build view &Layouts

### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Define to develop simple GUI Applications	K1
CO2	Extend and able to use widgets and components in their android applications	K2
CO3	Apply to work with database locally & cloud	K3
CO4	Examine to deploy the applications by inheriting web services.	K4



## SYLLABUS

20CEP01	Mobile Application Development	I
Unit No.	Topics	Hours
I	<b>INTRODUCTION TO ANDROID:</b> What is Android - History and Version - Installing software's - Setup Eclipse - Hello Android example - Internal Details - Dalvik VM - Software Stack - Android Core Building Blocks - Android Emulator - AndroidManifest.xml - R.java file - Hide Title Bar - Screen Orientation.	12
II	<b>WIDGETS &amp; USER INTERFACE:</b> Working with Button - Toast - Custom Toast - Button - Toggle Button - Switch Button - Image Button – Check Box – Alert Dialog - Spinner - Auto Complete Text View – Rating Bar – Date Picker – Time Picker- Progress Bar - Quick Contact Budge -Analog Clock and Digital Clock - Working with hardware Button - File Download	12
III	<b>ACTIVITY, INTENT &amp; FRAGMENT</b> Activity Lifecycle - Activity Example - Implicit Intent - Explicit Intent - Fragment Lifecycle -Fragment Example - Dynamic Fragment. Android Menu. <b>LAYOUT&amp;VIEW:</b> Option Menu - Context Menu - Popup Menu - Relative Layout - Linear Layout - Table Layout - Grid Layout	12
IV	<b>ANDROID ADAPTOR VIEW:</b> Array Adaptor – Array List Adaptor - Base Adaptor – Grid View – Web View – Scroll View – Search View – Tab Host - Dynamic List View - Expanded List View. <b>ANDROID SERVICES:</b> Android Service - Android Service API - Android Started Service - Android Bound Service - Android Service Life Cycle - Android Service Example	12
V	<b>Data Storage:</b> Shared Preferences - Internal Storage - External Storage <b>SQLite:</b> SQLite API – SQ Lite Spinner – SQLite List View - API - Android Web Service	12

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning



### TEXT BOOK

1. *Android Developer Fundamental course - Learn to Develop Android Applications - Google Developer Training Team 2016.*

### REFERENCE BOOKS

1. *Android Application Development for Dummies 3rd Edition published by John Wiley& Sons, Inc.2015*

2. *Android Programming for Beginners John Horton - December 2015*

3. *Complete Introduction for Beginners –Step By Step Guide How to Create Your Own Android App Easy! - Matthew Gimson -2015.*

### WEB RESOURCES

1. <https://books.goalkicker.com/AndroidBook/>



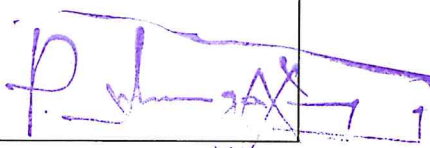
### MAPPING WITH PROGRAM OUTCOMES

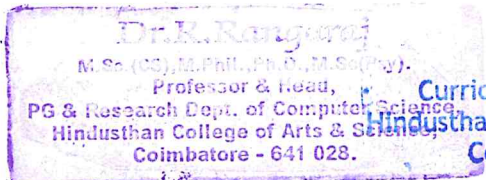
CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M	M	M	L
CO3	S	S	S	M
CO4	L	M	M	L


S - Strong; M-Medium; L-Low.

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 K.S.SENTHILKUMAR	 Dr.R.RANGARAJ	

  
Dr. R. Rangaraj  
M. Sc (CC), M. Phil., Ph. D., M. Sc (IT)  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

  
Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	<b>20CEP02</b>	<b>Analysis &amp; Design of Algorithms</b>						<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>
							<b>Semester:</b>	<b>I</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>4</b>

#### **COURSE OBJECTIVE**

- Enable the students to learn the basic of Designing.
- Make the students learn mathematical background for analysis of algorithm
- Demonstrate a familiarity with major algorithms and data structures.
- Reinforce basic design concepts (e.g., pseudo code, specifications, top-down design).

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Choose mathematical foundation in analysis of algorithms.	K1
CO2	Describe with different algorithmic design strategies	K2
CO3	Apply design principles and concepts to algorithm design	K3
CO4	Analyze to choose appropriate algorithm design techniques for solving problems.	K4

## SYLLABUS

20CEP02	Analysis & Design of Algorithms	I
Unit No.	Topics	Hours
I	<b>Design of Efficient Algorithms:</b> Data Structures: lists, queues, and stacks-set representation-graphs-trees-recursion-Divide and Conquer-Balancing-Dynamic programming-Epilogue Data Structure for Set manipulation Problems: Fundamental operations on sets-Hashing-Binary Search-Binary Search trees-Optimal binary trees-A simple Disjoint –Set union algorithm- Balanced Tree schemes-Partitioning.	12
II	<b>Elementary Data Structures:</b> Stacks and Queues – Trees – Binary Trees–Binary Search Trees–Iterative and Recursive Search of BST–Graphs– Konigsberg Bridge Problem – Graph Representations - Graph Traversals. <b>Greedy Methods:</b> Knapsack Problem, Minimum Cost Spanning Trees, Optimal Storage on Tapes and Single Source Shortest Path Problem.	12
III	<b>Dynamic Programming:</b> General method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling	12
IV	<b>Backtracking:</b> General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem – Branch and bound:-The method– 0/1 Knapsack Problem – traveling salesperson.	12
V	<b>Branch and Bound:</b> <b>The Method-</b> Least Cost Search. Bounding: FIFO Branch and Bound and LC Branch and Bound-0/1 Knapsack Problem-Travelling Salesman Problem-Efficiency Considerations.	12

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and analysis of Computer Algorithms", Pearson Education, 1999. (UNIT I – Chapter 2 &4)
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithm", Galgotia Publications, 2007. (UNIT II – Chapter 2 &4, UNIT III – Chapter 5, UNIT IV – Chapter 7, UNIT V – Chapter 8)

### REFERENCE BOOKS

1. Goodman and S. T. Hedetniem, "Introduction to the Design and Analysis of Algorithms MGH.
2. Aho A. V, John E. Hopcroft Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education.
3. Lakshmi varahan S, Sudarshan K Dhall. "Analysis and Design of Parallel Algorithms", Mcgraw hills series.

### WEB RESOURCES

1. <https://kailash392.files.wordpress.com/2019/02/fundamentals-of-computer-algorithms-by-ellis-horowitz.pdf>

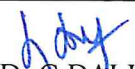

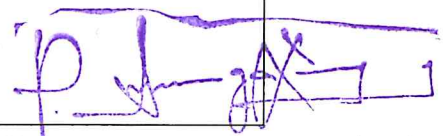
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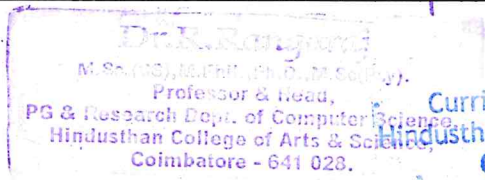
CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	L
CO2	S	M	S	L
CO3	S	S	S	L
CO4	L	M	M	L

S - Strong; M-Medium; L-Low.

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Dr. G. DALIN	 Dr. R. RANGARAJ	

  
Dr. R. Rangaraj  
M.Sc., M.Phil., Ph.D., M.S., M.Tech.  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.



<b>Course Code:</b>	20CEP03	<b>Advanced Java Programming</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>I</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>5</b>

#### **COURSE OBJECTIVE**

- Remember to code, compile, and execute programs while learning advanced programming concepts.
- To demonstrate the use of good object-oriented design principles including encapsulation and information hiding.
- Demonstrating the use of a variety of basic control structures including selection and repetition.
- Creating RMI application with Framework.

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	List classes, objects, members of a class and relationships among them needed for a specific problem.	K1
CO2	Classify dynamic web pages, using Servlets and JSP.	K2
CO3	Apply to develop RMI application using Java Spring Framework	K3
CO4	Analyze and classify the type of framework and its advantages	K4



## SYLLABUS

20CEP03	Advanced Java Programming	I
Unit No.	Topics	Hours
I	<b>Overview:</b> Object Oriented Programming-Simple Program-Second short program-Two control statements. Introducing Classes - class fundamentals - Declaring objects – assigning object reference-Variables - introducing methods - constructors.	12
II	<b>Multithreaded Programming:</b> The Java Thread Model - Main Thread- creating a Thread - Creating Multiple Threads - using is Alive () and join () - Thread Priorities - Synchronization – Inter thread communication - Suspending ,resuming and stopping Threads.	12
III	<b>Networking:</b> Networking basics - java and the Net - Inet Address - Inet4Address and Inet6Address - TCP/IP Client Sockets - URL - URL Connection - TCP/IP Server Sockets - Datagram - URL Class.	12
IV	<b>Structs :</b> Introduction to Structs : What is Structs - Features –Model1 vs. Model2 -Custom Validation – Bundled Validators – Ajax Validation View – Controller MVC Design Pattern – tags – UI Components. <b>Hibernate:</b> Introduction to Hibernate Framework –ORM Tool-Architecture- Hibernate using XML – Web application	12
V	<b>Spring:</b> Introduction to Spring Framework – Framework of Swing-Advantages of Spring Framework - Modules – Application –IoC Container-Dependency Injection - Constructor Injection- RMI- Integration of RMI in Spring.	12

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

## TEXT BOOKS

1. Herbert Schildt - "The complete Reference Java ",TataMcGrawHill,5<sup>th</sup>edition,2005.

## REFERENCE BOOKS

1. Deitel&Deitel, "Java How to Program", Prentice Hall, 5th Edition,2002.
2. The Complete Reference 2<sup>nd</sup> Edition James Holmes" TataMcgrawhill2<sup>nd</sup> Edition 2007.

## WEB RESOURCES

1. <https://beginnersbook.com/java-tutorial-for-beginners-with-examples/>



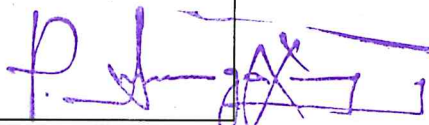
## MAPPING WITH PROGRAM OUTCOMES

PO CO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	M	S
CO3	M	S	S	S
CO4	M	S	S	S

S - Strong; M-Medium; L-Low.

## ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 S.SASIKALA	 Dr.R.RANGARAJ	

Dr.R. Rangaraj  
M.Sc.(CC), M.Phil., Ph.D., M.S.(Cy)  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP04	Advanced Software Engineering						<b>Batch:</b>	2020-2021 &Onwards
								<b>Semester:</b>	I
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	4

#### COURSE OBJECTIVE

- Knowledge of basic SW engineering methods and practices, and their appropriate Application.
- Remembering software engineering layered technology and Process framework.
- A general understanding of software process models such as the waterfall and evolutionary Models.
- Understanding of software requirements and the SRS documents.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Select approaches to verification and validation including static analysis, and reviews.	K1
CO2	Describe software testing approaches such as unit testing and integration testing	K2
CO3	Organize software measurement and software risks	K3
CO4	Analyze on quality control and how to ensure good quality software.	K4



**SYLLABUS**

20CEP04	Advanced Software Engineering	I
Unit No.	Topics	Hours
I	<b>The Product and The Process:</b> The Evolving role of Software – Process methods and tools – Software process models – Linear sequential model – Prototyping model – Real model – Evolutionary software process model – Formal methods model – Fourth generation techniques – Project management concepts – Software process and project metric.	12
II	<b>Software Project Planning:</b> Software Project Planning – Observation on estimating software Scope, Resources, Project estimation, Decomposition techniques, Empirical estimation models – The Make Busy divisions – Risk management – Software risk identification –Risk projection, Risk mitigation – Monitoring and management.	12
III	<b>Project Scheduling and Tracking:</b> Project Scheduling and Tracking-Basic concepts – Defining a task set for the software project –Scheduling plan – Software quality assurance – Quality concepts and assurance – Software reliability – ISO 9000 Quality standards –Software configuration management – Software reviews – Formal technical reviews – Statistical qualityassurance.	12
IV	<b>Conventional Methods For Software Engineering:</b> System Engineering: System engineering hierarchy – Analysis concepts and principles – Requirements analysis – Communication techniques – Analysis, principles– Software prototyping – Specification modeling and information flow – Behavioral modeling – Mechanics of structured analysis – Design concepts and principles – Design process – Principles– Concepts – Effective modular design. Architectural design – Data design – Transform mapping–Transaction Mapping – User Interface Design.	12
V	<b>Software Testing Methods :</b> Fundamentals–Test case design–White box testing – Basis path testing – Control structure testing – Black box testing– Testing for specialized environment – Testing strategies – Unit testing –Integration – Validation – System testing – Art of debugging. Object Oriented Software Engineering-Concept and Principles, Design. Reengineering-Business Process Re-engineering, Software Re-engineering.	12

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. Roger S Pressman, "Software Engineering: A Practitioner's Approach, McGraw Hill (2000)

### REFERENCE BOOKS

1. Richard Fairley, "Software Engineering Concepts", McGraw-Hill 2004.
2. Aggarwal KK, Yogesh Singh, "Software Engineering", Newage International Publishers, Third Edition.
3. Pankaj Jalote, "An Integrated Approach to Software Engineering", Narosa Publishing House, Delhi, 3<sup>rd</sup> Edition.

### WEB RESOURCES

1. <http://www.ddegjust.ac.in/studymaterial/mca-3/ms-12.pdf>

### MAPPING WITH PROGRAM OUTCOMES

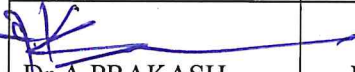

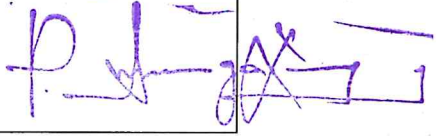
CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	L	M	S
CO3	S	M	M	M
CO4	L	M	M	S

S - Strong; M-Medium; L-Low.



**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Dr.A.PRAKASH	 Dr.R.RANGARAJ	

*Dr. R. Rangaraj*  
M.Sc.(CC), M.Phil., Ph.D., M.Sc.(IT),  
Professor & Head,  
PG & Research Dept. of Computer  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	<b>20CEP05</b>	<b>Practical I : Mobile Application Programming</b>						<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>
								<b>Semester:</b>	<b>I</b>
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>-</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>5</b>	<b>Credits:</b>	<b>3</b>

#### **COURSE OBJECTIVE**

- Ability to understand about Android studio and Eclipse Environment
- Able to Create GUI application with Multi-screen Templates
- Deploy SQLite with Application
- Design their application using Web Services

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Define a Mobile Application using Android Studio	K1
CO2	Interpret to use widgets and components in their android applications	K2
CO3	Apply to work with database locally & cloud	K3
CO4	Examine to deploy the applications by inheriting web services.	K4

**SYLLABUS**

20CEP05	Practical I : Mobile Application Programming	I
Ex. No.	PROGRAM LIST	Hours
1.	Create a simple Login App using Using Database	5
2.	Design and implement a single screen app that displays information about a fictional small business	5
3.	Build a Score Keeper app, which gives a user the ability to keep track of the score of two different teams playing a game of your choice	5
4.	Create a simple file upload program with user authentication	5
5.	Create a simple application to find a Location of your android device	5
6.	Create a simple dictionary App	5
7.	The Quiz App	5
8.	Musical Structure App	5
9.	Tour Guide App	5
10.	News App	5

**Teaching methods:**

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- Flipped Learning and Flipped Classroom
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- Usage of Projectors
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- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

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CO3	S	S	S	M
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Dr. R. Rangaraj  
M.Sc.(CS), M.Phil., Ph.D., M.Tech.  
Professor & Head,  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
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<b>Course Code:</b>	20CEP06	<b>Practical II: Java Programming</b>						<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>
								<b>Semester:</b>	
<b>Hrs/Week:</b>	5	L	-	T	-	P	5	<b>Credits:</b>	3

#### **COURSE OBJECTIVE**

- Remembering simple application using object oriented concepts using java
- Understanding the concepts of Framework applied in java.
- Evaluate the techniques of RMI in java
- Create a Simple application in GUI Environment.

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Observe to develop simple GUI Applications	K1
CO2	Extend on developing RMI Application	K2
CO3	Experiment with an application using Framework	K3
CO4	Classify and understand the concepts of Hibernate	K4

## SYLLABUS

20CEP06	PRACTICAL II : Java Programming	I
Ex. No.	PROGRAM LIST	Hours
1.	Demonstrate REMOTE METHOD INVOCATION application using Java	4
2.	Create an Event Driven Java Application. (Mouse Events/Keyboard Events)	4
3.	Exhibit Socket Programming for Two way communication in java.	4
4.	Create a Java program to display IP ADDRESS and HOST NAME of the machine	4
5.	Illustrate a concept of inheritance with Servlet	4
6.	Design a java program to implement GUI WITH BORDER LAYOUT.	4
7.	Create a Event Handler program using Spring Framework	4
8.	Create a File upload program using Struts Framework	4
9.	Create a program for handling exceptions using Struts.	4
10.	Demonstrate simple JAVA BEANS applications.	4
11.	Build a java program to execute NETWORKING concept.	5
12.	Design a java program to perform ANIMATION of different shapes.	5

### Teaching methods:

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- Active Learning Forums
- Usage of Projectors
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- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning



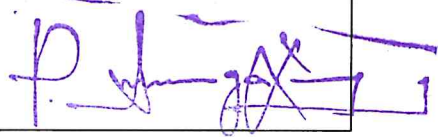
## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
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S - Strong; M-Medium; L-Low

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 S.SASIKALA	 Dr.R.RANGARAJ	

*Dr.R.Rangaraj*  
M.Sc.(CS), M.PHIL., Ph.D., M.Sc(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

Course Code:	20CEP07	Advanced Operating System						Batch:	2020-2021 &Onwards
Hrs/Week:	5	L	P	T	-	P	-	Semester:	II
								Credits:	4

#### COURSE OBJECTIVE

- Remembering the Main components of an OS & their functions.
- Learning the mechanisms of OS to handle processes and threads and their communications.
- Gain insight into the components and management aspects of real time and mobile operating systems.
- Develop real-time algorithm for task scheduling.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the importance of computer system resources and the role of operating system in their management policies and algorithms.	K1
CO2	Illustrate the working of real-time operating systems and real-time database.	K2
CO3	Examine the hardware and software issues in modern distributed systems.	K3
CO4	Organize the requirement for process synchronization and coordination handled by operating system	K4



## SYLLABUS

20CEP07	Advanced Operating System	II
Unit No.	Topics	Hours
I	<b>Basics of Operating Systems:</b> What is an Operating System? – Main frame Systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real-Time Systems – Handheld Systems – Feature Migration – Computing Environments – Process Scheduling – Cooperating Processes – Inter Process Communication- Deadlocks – Prevention – Avoidance– Detection – Recovery.	12
II	<b>Distributed Operating Systems:</b> Issues – Communication Primitives – Lamport's Logical Clocks – Deadlock handling strategies – Issues in deadlock detection and resolution distributed file systems –design issues – Case studies – The Sun Network File System-Coda.	12
III	<b>Real time Operating Systems :</b> Introduction – Applications of Real Time Systems – Basic Model of Real Time System – Characteristics – Safety and Reliability - Real Time Task Scheduling	10
IV	<b>Operating Systems for Handheld Systems:</b> Requirements – Technology Overview – Handheld Operating Systems – Palm OS- Symbian Operating System- Android – Architecture of android – Securing handheld systems	13
V	<b>Case Studies:</b> Linux System: Introduction – Memory Management – Process Scheduling – Scheduling Policy - Managing I/O devices – Accessing Files- iOS : Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System.	13

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
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- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. William Stallings, "Operating systems", Pearson Prentice Hall, 6<sup>th</sup> Edition, 2009.
2. Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.

### REFERENCE BOOKS

1. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004.
2. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.
3. Pramod Chandra P. Bhatt, "An introduction to operating systems, concept and practice", PHI, Third edition, 2010

### WEB RESOURCES

1. <https://www.doccity.com/en/notes-for-distributed-operating-system/2725203/>




### MAPPING WITH PROGRAM OUTCOMES

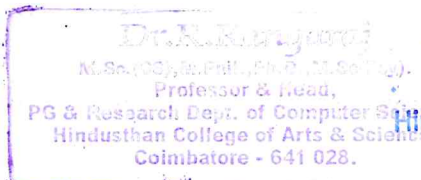
PO CO	PO1	PO2	PO3	PO4
CO1	M	M	M	S
CO2	M	S	M	S
CO3	S	M	M	S
CO4	M	M	M	M

S - Strong; M-Medium; L-Low.

### ASSESSMENT PATTERN

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Course Designed by	Verified by HOD	
G.SIVABRINDHA 	Dr.R.RANGARAJ 	

  
Dr. R. Rangaraj  
M.Sc. (CC), M.Phil., Ph.D., M.S. (Soc.)  
Professor & Head,  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	<b>20CEP08</b>	<b>Open Source Database Management System</b>						<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>
							<b>Semester:</b>	<b>II</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>5</b>

#### **COURSE OBJECTIVE**

- Remembering the relational model of data and usage of Relational Algebra.
- Create a relational database using a relational database package.
- Design to facilitating the student to understand the various functionalities of DBMS software.
- Analyze the operations related to creating, manipulating and maintaining databases for Real-world applications.

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Define the structure and model of the relational database system	K1
CO2	Classify multiple tables, and using group functions, sub queries	K2
CO3	Establish a database based on a data model considering the normalization to a specified level	K3
CO4	Analyze the storage size of the database and design appropriate storage techniques	K4

**SYLLABUS**

20CEP08	Open Source Database Management System	II
Unit No.	Topics	Hours
I	<b>Database internals and Advanced concepts:</b> Introduction- Data Models - Entity Relationship model - Relational model – Relational Database - Introduction - SQL - Other Relational languages - Integrity and Security – Relational Database design.	12
II	<b>Transaction Management:</b> Overview of Transaction Management- The ACID properties – Transactions and Schedules– Concurrent execution of Transactions – Lock based concurrency control – Performance of locking - Transaction support in SQL – Introduction to crash recovery – The log – Other recovery related structures – Check pointing – Recovering from a system crash – Media Recovery.	12
III	<b>Object based Databases and XML:</b> Structured Data Types - Operations on Structured Data - Encapsulation and ADTs –Inheritance - Objects, OIDs, and Reference Types - Database Design for an ORDBMS – ORDBMS Implementation Challenges – OODBMS - Comparing RDBMS, OODBMS, and ORDBMS –XML – Background – Structure of XML Data – XML Document Schema – Querying and Transformation - The Application program interface – Storage of XML data- XML Application -Case Study in XML.	12
IV	<b>Parallel and Distributed Databases:</b> Distributed Databases – Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols – Concurrency Control in Distributed Databases – Availability - Distributed Query Processing - Heterogeneous Distributed Databases -Directory Systems - Parallel Databases – Introduction - I/O Parallelism – Inter query Parallelism –Intra operation Parallelism - Interoperation Parallelism - Design of Parallel Systems – Case Study in Oracle.	12
V	<b>No SQL:</b> No SQL Basics - Interfacing and Interacting with No SQL – Storage Architecture – CRUD Operations – No SQL Stores Queries - Data Stores Modifications and Evolution Management -Indexing and Ordering Data Sets – No SQL in Cloud – Case Study in Mongo DB.	12



**Teaching methods:**

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- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. Silberschatz, Korth, Sudarshan, "Database system concepts", 4th Edition, Tata McGraw Hill-2013 (For UNITS I,III,IV).
2. Shashank Tiwari, "Professional NoSQL", 1<sup>st</sup> Edition-2011(For UNITV).

**REFERENCE BOOKS**

1. Ramakrishnan, Gehrke, "Database Management Systems", Tata Mc Graw Hill
2. Ramez Elmasri and Shamkant B.Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2008.
3. G.K.Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

**WEB RESOURCES**

1. <https://pdfs.semanticscholar.org/0390/91a2f0772060b60d97df25c59f1000e20aed.pdf>

**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	S	S
CO3	S	M	M	S
CO4	M	S	M	S

S-Strong; M-Medium; L-Low

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Mrs.S.Arulmozhi	Dr.R.RANGARAJ	

Dr.R.Rangaraj  
M.Sc.(CS), M.Phil., Ph.D., M.Ed.(U)  
Professor & Head,  
PG & Research Dept. of Computer  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP09	<b>Web Programming Using Open Source Technologies</b>						<b>Batch:</b>	2020-2021 & Onwards
								<b>Semester:</b>	II
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	5

#### **COURSE OBJECTIVE**

- Remembering to get familiar with basics of the Internet Programming.
- Acquire knowledge and skills for creation of web site considering both client and server side.
- Implement interactive web page(s) using HTML, CSS and JavaScript.
- Ability to develop responsive web applications

#### **COURSE OUTCOMES (CO)**

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Define interactive web page(s) using HTML, CSS and JavaScript.	K1
CO2	Illustrate a responsive web site using HTML5 and CSS3.	K2
CO3	Apply Dynamic web site using server side PHP Programming and Database connectivity.	K3
CO4	Determine and differentiate different Web Extensions and Web Services.	K4

**SYLLABUS**

20CEP09	<b>Web Programming Using Open Source Technologies</b>	<b>II</b>
<b>Unit No.</b>	<b>Topics</b>	<b>Hours</b>
<b>I</b>	<b>Introduction :</b> Server-Side Web Scripting - Syntax and Variables-Control and Functions. Passing Information between Pages: GET Arguments - POST Arguments - Formatting Form Variables - PHP Super global Arrays	<b>12</b>
<b>II</b>	<b>Data Manipulations:</b> Strings in PHP - String Functions-Arrays and Array Functions: Creating Arrays - Retrieving Values - Multidimensional Arrays - Inspecting Arrays - Deleting from Arrays - Iteration. Advanced Array Functions: Transformation of Arrays. Number Handling: Numerical Types - Mathematical Operators - Simple Mathematical Functions - Randomness.	<b>12</b>
<b>III</b>	<b>Session and Cookies :</b> Regular Expressions: Tokenizing and parsing Functions - Regular Expressions - Perl - Compatible Regular Expressions - Advanced String Functions. Working with the File system: PHP File Permissions - File Reading and Writing Functions - File system and Directory Functions - Network Functions - Date and time Functions - Calendar Conversion Functions. Working with Sessions and Cookies: Sessions work in PHP - Session Functions - Configuration Issues - Cookies - Sending HTTP Headers	<b>12</b>
<b>IV</b>	<b>Structured Query Language (SQL):</b> Relational Database and SQL-SQL standards-The Workhorses of SQL- Database Design-Privileges and Security. PHP and MySQL: Connecting to MySQL - Making MySQL Queries - Fetching Data Sets - Multiple Connections - Error Checking - Creating MySQL Databases with PHP - MySQL Functions.	<b>12</b>
<b>V</b>	<b>CONTENT MANAGEMENT SYSTEM :</b> What is CMS – Word press - Joomla - Drupal -Magento - Prestashop - Comparison of Content Management System ,Opencart , Cscart. Search Engine Optimization - How it Works - How SEO in marketing	<b>12</b>



### Teaching methods:

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### TEXT BOOKS

*1. Steve Suehring Tim Converse and Joyce Park, "PHP6 and MySQL Bible", Wiley- India. New Delhi 2009*

### REFERENCE BOOKS

- 1. Dacie Cristian, "Pack Pub AJAX and PHP"-2006*
- 2. Scouarnec Yam, Stolz Jeremy Jeremy and Glass Michael, "Beginning PHP5, APACHE, MYSQL Web Development", Wiley-India. New Delhi, 2005 Steven Holzner, "The Complete Reference", Tata McGraw Hill Edition, New Delhi, 2009*

### WEB RESOURCES

- 1. <https://www.tutorialspoint.com/php/index.htm>*
- 2. <http://www.tizag.com/phpT/>*



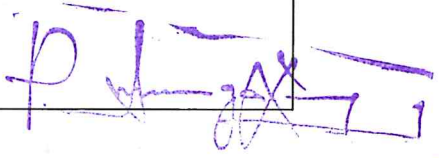
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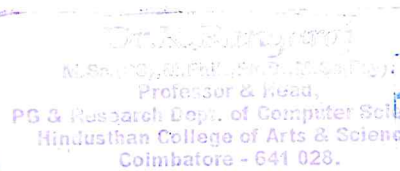
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Co-ordinator  
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<b>Course Code:</b>	<b>20CEP10</b>	<b>Machine Learning &amp; Robotics</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>II</b>	
<b>Hrs/Week:</b>	<b>4</b>	<b>L</b>	<b>4</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>Credits:</b>	<b>4</b>	

#### **COURSE OBJECTIVE**

- Learning artificial intelligence (AI) means and how machines can be made to process information intelligently.
- Identify the different fields that comprise AI, namely search techniques.
- Understanding the fundamental concepts of Machine learning of data, model selection.
- Learning Robotics & creating application.

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME BLOOMS LEVEL</b>	<b>BLOOMS LEVEL</b>
CO1	Observe a problem and Use AI technique to Process Information	K1
CO2	Illustrate Search engine optimization technique to resolve problem reduction	K2
CO3	Develop about robotics application developments	K3
CO4	Categorize to understand about different type of sensors and its implementation procedures	K4

**SYLLABUS**

20CEP10	Machine Learning & Robotics	II
Unit No.	Topics	Hours
I	<b>The AI Problems:</b> AI technique – Criteria for success – Define the Problem as a state space search – Production System – Characteristics – Problem Characteristics. Heuristic Search Techniques: Generate and Test – Problem Reduction – Constraints Satisfaction – Means End Analysis.	10
II	<b>Knowledge Representation Issues:</b> Approaches to knowledge Representation – The Frame Problem – Computable Functions & Predicates – Resolution – Procedural versus Declarative Knowledge. Machine learning: Introduction-Defining Planning-Building a data team-Data Processing-Data Storage	10
III	Decision trees-Basics of decision tree-uses-Advantages-Limitations- Different Algorithm-working-Training Data-Testing the Classifier code- Baye's Theorem- Baysian Network-Assigning Probabilities- Calculating Results- Node counts.	10
IV	<b>Fundamentals of Robotics:</b> Introduction, classification of Robots, History of Robots, Advantages and Disadvantages of Robot, Robot components, Robot degree of freedom, Robot joints and coordinates, Robot workspace, Robot reach, Robot languages	10
V	<b>Sensors:</b> Introduction to internal and external sensors of the robo Position sensors, Velocity sensors, Acceleration sensors, SONAR and IR sensors, Touch and tactile sensors. <b>Applications of Robots:</b> Applications of robots, selection of robots, economic factors and justification for robotic application; safety requirements.	10



**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, Second Edition, Tata McGraw Hill 2003.
2. "Machine Learning for Big data", Author: JASON BELL Publication: WILEY
3. Craig JJ, "Introduction to Robotics, Mechanics and Control", Pearson Education, New Delhi, 2004.

**REFERENCE BOOKS**

1. Saeed BNiku, "Introduction to Robotics", Pearson Education, New Delhi 2003
2. George FLuger, "Artificial Intelligence", Pearson Edition Publication, 4th Edition, 2002
3. Sudha Sadasivam, "Artificial Intelligence", Charulatha Publications, 2013

**WEB RESOURCES**

1. [https://www.dcehvpvm.org/E-Content/BCA/BCA-III/artificial\\_intelligence\\_tutorial.pdf](https://www.dcehvpvm.org/E-Content/BCA/BCA-III/artificial_intelligence_tutorial.pdf)



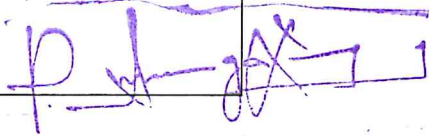
**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	L
CO2	S	M	S	L
CO3	S	S	S	L
CO4	L	M	M	L

S - Strong; M-Medium; L-Low.

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 S.LAKSHMIPRIYA	 Dr.R.RANGARAJ	

*Dr. Rangaraj*  
M.Sc. (CS), M.Phil., Ph.D. (CS),  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP11	<b>Practical III: Open Source Database Management System</b>					<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>	
						<b>Semester:</b>	<b>II</b>		
<b>Hrs/Week:</b>	4	L	-	T	-	P	4	<b>Credits:</b>	2

#### **COURSE OBJECTIVE**

- A strong formal foundation in database concepts.
- Introduction to systematic database design approaches covering conceptual design logic design and an overview of physical design.
- To present the concepts and techniques relating to ODBC and its implementations.
- The concepts of transactions and transaction processing and techniques relating to concurrency and recovery in multi-user database environments.

#### **COURSE OUTCOMES (CO)**

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	List out the underlying concepts of database technologies	K1
CO2	Illustrate and implement a database schema for a given problem domain	K2
CO3	Establish the enforce integrity constraints on a database	K3
CO4	Organize programming PL/SQL including stored procedures, stored functions, cursors and packages	K4

**SYLLABUS**

<b>20CEP11</b>	<b>PRACTICAL III - Open Source Database Management System</b>	<b>II</b>
<b>Ex. No.</b>	<b>PROGRAM LIST</b>	<b>Hours</b>
1	Creation of a database and writing SQL queries to retrieve information from the database by performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records.	4
2	Creation of database for Procedures, Triggers and Functions.	4
3	Creation of Views, Synonyms, Sequence, Indexes, save point.	4
4	Creating an Employee database to set various constraints and joins.	4
5	Creating a database for college admission system by using relationship between the databases.	4
6	Implement Postgre SQL for Personal Information System.	4
7	Create a function that calculates tax on a personal member's salary.	4
8	Exhibit Web Based User Identification System using Oracle/ My SQL	4
9	Demonstrate Railway Reservation System using Oracle/ My SQL	4
10	Create Timetable Management System using Oracle/ My SQL	4



**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**MAPPING WITH PROGRAM OUTCOMES**

PO \ CO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	S	M
CO3	S	M	S	S
CO4	M	S	M	S

S - Strong; M-Medium; L-Low.

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
Mrs. S. Arulmozhi	Dr. R. RANGARAJ	

Dr. R. Rangaraj  
M. Sc. (PG), M. Phil., Ph. D., M. Ed. (PG)  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

Course Code:	20CEP12	Practical IV: Web Programming						Batch:	2020-2021 &Onwards
							Semester:	II	
Hrs/Week:	5	L	-	T	-	P	5	Credits:	3

#### COURSE OBJECTIVE

- Ability to understand mark up languages and Scripting languages
- Deploy a simple web application using PHP &MYSQL
- Knowledge on Creating a Simple Forum based application
- Design Develop Debug and Deploy an application with Admin Panel and Understand the knowledge on Word press.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	List out and develop simple GUI Applications	K1
CO2	Demonstrate a web application using PHP & MYSQL	K2
CO3	Applying Template in Web Application	K3
CO4	Correlate an application using Client / Server Panel in Web Environment.	K4

**SYLLABUS**

20CEP12	PRACTICAL IV : Web Programming	II
Ex. No.	PROGRAM LIST	Hours
1.	Design and create a program for implementing Inheritance.	5
2.	Develop a program to send an HTML formatted Email with attachment in PHP.	5
3.	Develop and demonstrate a program for login authentication using PHP and My SQL.	5
4.	Creating Crud Grid For A Student Database Using PHP and My SQL.	5
5.	Develop a program to upload a file in PHP.	5
6.	Design and create a RSS feed using PHP and My SQL.	5
7.	Create a Pay slip for an employee using PHP and My SQL.	5
8.	Create a simple Discussion board for students to share their knowledge	5
9.	Build a college website using Word press Theme.	5
10.	Create a home page and customize the data through Admin Panel	5

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning


**MAPPING WITH PROGRAM OUTCOMES**


CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M	M	M	L
CO3	S	S	S	M
CO4	L	M	M	L

S - Strong; M-Medium; L-Low

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
K.S.SENTHILKUMAR	Dr.R.RANGARAJ	

  
Dr. R. Rangaraj  
M.Sc., M.Phil., Ph.D., P.G.D.  
Professor & Head  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.  
Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.



<b>Course Code:</b>	<b>20CEPV01</b>	<b>DIGITAL MARKETING</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>I</b>	
<b>Hrs/Week:</b>	<b>2</b>	<b>L</b>	<b>2</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>1</b>

**COURSE OBJECTIVE:**

- To provide the knowledge of digital marketing and its importance for marketing success
- To develop a plan, digital channels and Google Ad Words campaigns.
- The social media planning and implement
- Analytics of digital marketing.

**COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Observe and Comprehend basic marketing concepts.	K1
CO2	Classify the importance of conversion and working with digital relationship marketing.	K2
CO3	Develop the confluence of marketing, operations, and human resources in real-time delivery..	K3
CO4	Evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.	K4

## SYLLABUS

20CEPV01	DIGITAL MARKETING	I
Unit No.	Topics	Hours
I	Principles of Digital Marketing: Basics of Marketing-What is Digital Marketing?-Comparison of Traditional and Digital Marketing-Statistics of Digital Marketing-Benefits of Digital marketing-Latest Digital marketing trends-Digital marketing platforms-Digital Marketing strategy for websites-Career opportunities in digital marketing	10
II	Social Media Marketing: Introduction to social media marketing-Face book marketing-Face book advertising-YouTube marketing-Twitter marketing-LinkedIn marketing-Instagram Marketing-Document Sharing Site Email Marketing: What is Email Marketing-Benefits of email marketing-Basic terminology in email marketing-Email Marketing software.	10
III	Google AdSense and Affiliate Marketing: Online money earning strategies-Success stories of online entrepreneurs-Planning a website for Adsense-What is Adsense?-Types of Bidding-Implementing Ads in a Website-What is Affiliate Marketing-Types of Affiliate Marketing-Making Money using Affiliate Marketing-Popular Affiliate Networks-Freelancing Business Strategies.	10

## TEXT BOOKS

1. Kevin Urrutia & Wilson Lin, "Digital Marketing Made Easy", FORBES, Kindle Edition.

## REFERENCE BOOKS

[https://www.amazon.com/dp/B08B5JW2SR/ref=rdr\\_kindle\\_ext\\_tmb](https://www.amazon.com/dp/B08B5JW2SR/ref=rdr_kindle_ext_tmb)

## WEB RESOURCES

1. <https://blendingfotech.com/digital-marketing-course-syllabus/India>
2. [https://www.deccansoft.com/Documents/SyllabusDocs/7f53e17e-b4a1-45d2-b3b0-bafd2a504d27\\_Syllabus\\_of\\_Digital\\_Marketing.pdf](https://www.deccansoft.com/Documents/SyllabusDocs/7f53e17e-b4a1-45d2-b3b0-bafd2a504d27_Syllabus_of_Digital_Marketing.pdf)

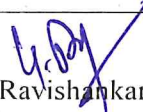


### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	L	M	M	L
CO2	M	L	L	M
CO3	M	S	L	S
CO4	S	M	S	L

S-Strong, M- Medium, L – Low

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Mr. G. Ravishankar	 Dr. R. RANGARAJ	

**Dr. R. Rangaraj**  
M.Sc.(CS), M.Phil., Ph.D., M.Sc(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
**Academic Audit Cell**  
**Hindusthan College of Arts & Science,**  
**Coimbatore-641 028.**

<b>Course Code:</b>	20CEPV02	<b>Digital Humanities</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>II</b>	
<b>Hrs/Week:</b>	2	L	2	T	-	P	-	<b>Credits:</b>	<b>1</b>

#### **COURSE OBJECTIVE**

- Exploring contested definitions of the digital humanities
- Exploring debates about the digital humanities within the emerging field
- Beginning to consider why the digital humanities matter beyond the academic field itself
- Through hands-on experimentation, trying out various types of digital humanities analysis using heterogeneous datasets, tools, and methods

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	Identify and Learn the prospects and limitations of science and technology in digital humanities, their role in society, and the individual's responsibility for how they are used	K1
CO2	Implement knowledge and understanding of the main field of study and significant in-depth knowledge in some subcategories of the digital humanities	K2
CO3	Analyze, questions, and situations related to the digital humanities as a field of study and work	K3
CO4	Classify and manage complex phenomena related to the digital humanities	K4



## SYLLABUS

20CEPV02	DIGITAL HUMANITIES	II
Unit No.	Topics	Hours
I	The digital humanities: Development - Beginnings of the intersection of humanities with computing-The second wave : qualitative and generative-Present state of DH- DH in India Week.	10
II	Digital Humanities: meaning and nature-Meaning and definitions -Features and principles-Methods and procedures-Using digital technology for academic purposes-Basics of computing, Editing tools	10
III	Using the Microsoft toolbar and networking tools like the Google drive- Wordpress (blogging)-Wordpress (website) Week-Digital Libraries and Archiving-Introduction: Opportunities and Challenges-Tools and Systems- Hands-On Work (to be posted on Wordpress)- Presentation of results	10

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

## TEXT BOOKS

1. *Exploring Digital Humanities in India: Pedagogies, Practices, and Institutional Possibilities* - by Maya Dodd (Editor), Nidhi Kalra (Editor) Routledge India; 1st Edition (July 9, 2020)
2. *Digital Humanities* - Berry David.M, Polity Press, ISBN: 9780745697666, 9780745697666

## REFERENCE BOOKS

1. *The Historical Web and Digital Humanities - The Case of National Web Domains* By Niels Brügger, Ditte Laursen Copyright Year 2019, ISBN 9781138294318, Published March 28, 2019 by Routledge

## WEB RESOURCES

1. [http://klangable.com/uploads/books/Simanowski\\_2016\\_Digital-Humanities-and-Digital-Media.pdf](http://klangable.com/uploads/books/Simanowski_2016_Digital-Humanities-and-Digital-Media.pdf)  
[https://www.deccansoft.com/Documents/SyllabusDocs/7f53e17e-b4a1-45d2-b3b0-bafd2a504d27\\_Syllabus\\_of\\_Digital\\_Marketing.pdf](https://www.deccansoft.com/Documents/SyllabusDocs/7f53e17e-b4a1-45d2-b3b0-bafd2a504d27_Syllabus_of_Digital_Marketing.pdf)




## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	M	S	M	S
CO2	M	M	M	L
CO3	S	L	S	L
CO4	L	M	M	L

S-Strong, M- Medium, L – Low

## ASSESSMENT PATTERN

Follows common-pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Ms. G. Siva Brindha	 Dr. R. RANGARAJ	

**Dr. R. Rangaraj**  
M.Sc.(CS), M.Phil., Ph.D., M.Sc(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
Academic Audit Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP13	<b>Digital Image Processing</b>						<b>Batch:</b>	2020-2021 &Onwards
							<b>Semester:</b>	III	
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	3

#### COURSE OBJECTIVE

- Remember and Review the fundamental concepts of a digital image processing system.
- Develop and Analyze images in the frequency domain using various transforms.
- Learn and Evaluate the techniques for image enhancement and image restoration.
- Applying the various compression techniques in image segmentation.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Select the need for image transforms and their properties	K1
CO2	Classify image processing application	K2
CO3	Apply different techniques employed for the enhancement of images	K3
CO4	Categorize the need for image compression and to learn the spatial and frequency domain techniques of image Compression and segmentation.	K4

**SYLLABUS**

20CEP13	DIGITAL IMAGE PROCESSING	III
Unit No.	Topics	Hours
I	<b>Introduction:</b> Introduction to Digital Image Processing – The Origins of Digital Image Processing- Gamma Ray Imaging – X Ray Imaging – Imaging in Ultra Violet band – Fundamental steps in Digital Image Processing – Components of an Image Processing System.	13
II	<b>Digital Image Fundamentals:</b> Elements of Visual Perception – Light and the electromagnetic spectrum – Image sensing and Acquisition – Image Acquisition using a single sensor - Image Acquisition using sensor-strips - Image Acquisition using sensor arrays – A simple image formation model. <b>Image Sampling and Quantization:</b> Basic Concepts in Sampling and Quantization - Representing digital images – Spatial & Intensity Resolution – Image Interpolation	13
III	<b>Image Processing:-</b> Functions - read write and show image - image reverse - image mirroring - Image shift -Image Resize-Image enhancement : Brightness & contrast - Negative- Histogram - Threshold - color -HSI-YIQ-GRAY IMAGE - Morphologic operations .Dilation - Erosion- Convolution - Edge Detection- Labeling - Create a simple application for image processing using Matlab	13
IV	<b>Image Compression:</b> Fundamentals – Spatial and Temporal Redundancy - Irrelevant Information - Measuring Image Formation – Image Compression Models – Compression Methods – Huffinan’s coding – Arithmetic coding – Digital image watermarking	13
V	<b>Image Segmentation:</b> Fundamentals of Image Segmentation – Thresholding – Using image smoothing to improve Global Thresholding – Using edges to improve Global Thresholding – Region based segmentation: Region growing – Region splitting – Region Merging Morphological Image Processing: Erosion and Dilation, Opening and Closing, Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology.	13



**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. Rafael Gonzalez, Richard E. Woods, "Digital Image Processing", Fourth Edition, PHI Pearson Education, 2013

**REFERENCE BOOKS**

1. Anil K. Jain- "Fundamentals of Digital Image Processing"- Prentice Hall. 2.Chanda & Majumdar- "Digital Image Processing and Analysis"- Prentice Hall- third edition.Delhi,2004.

**WEB RESOURCES**

1. <https://drive.google.com/file/d/1XHUj6MbdcE5nCK8tn-qsYLbR7oQJikkR/view?usp=sharing>
2. <https://www.smartzworld.com/notes/digital-image-processing-pdf-notes-dip/>



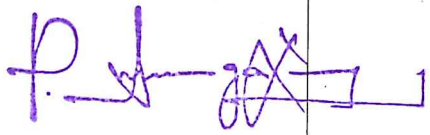
**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M	M	M	L
CO3	S	S	S	M
CO4	L	M	M	L

*S - Strong; M-Medium; L-Low.*

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 S.SASIKALA	 Dr.R.RANGARAJ	

**Dr.R.Rangaraj**  
 M.Sc.(CS), M.Phil., Ph.D., M.Sc(Ped).  
 Professor & Head,  
 PG & Research Dept. of Computer Science  
 Hindusthan College of Arts & Science,  
 Coimbatore - 641 028.

**Co-ordinator**  
 Academic Audit Cell  
 Hindusthan College of Arts & Science,  
 Coimbatore-641 028.

<b>Course Code:</b>	<b>20CEP14</b>	<b>Data Mining And Warehousing</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Semester:</b>	<b>III</b>
								<b>Credits:</b>	<b>5</b>

### COURSE OBJECTIVE

- Understand data warehouse concepts, architecture, business analysis and tools
- Analyze and Apply data pre-processing and data visualization techniques
- Apply clustering algorithms for finding hidden and interesting patterns in data
- Design and apply various classification and clustering techniques.

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Select simple KDD process and Data Warehouse	K1
CO2	Identify data pre-processing Classification Techniques	K2
CO3	Apply Clustering Algorithms on Various dataset using WEKA	K3
CO4	Evaluate to deploy the Data Mining tasks Using Algorithms	K4

**SYLLABUS**

20CEP14	DATA MINING AND WAREHOUSING	III
Unit No.	Topics	Hours
I	<b>INTRODUCTION</b> Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.	13
II	<b>FREQUENT PATTERN ANALYSIS</b> Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns	13
III	<b>CLASSIFICATION AND CLUSTERING</b> Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering– Clustering high dimensional data- Clustering with constraints, Outlier analysis- outlier detection methods.	13
IV	<b>WEKA TOOL</b> Datasets – Introduction, Iris plants database, Breast cancer database, Auto imports database – Introduction to WEKA, The Explorer – Getting started, Exploring the explorer, Learning algorithms, Clustering algorithms, Association-rule learners	13
V	<b>DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP)</b> Basic Concepts – Data Warehousing Components – Building a Data Warehouse – Database Architectures for Parallel Processing – Parallel DBMS Vendors – Multidimensional Data Model – Data Warehouse Schemas for Decision Support Concept Hierarchies -Characteristics of OLAP Systems – Typical OLAP Operations OLAP and OLTP.	13



**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. *Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.*

**REFERENCE BOOKS**

1. *Alex Berson and Stephen J. Smith, —Data Warehousing, Data Mining & OLAP, Tata McGraw-Hill Edition, 35th Reprint 2016.*
2. *K.P. Soman, Shyam Diwakar and V. Ajay, —Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.*
3. *Ian H. Witten and Eibe Frank, —Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.*

**WEB RESOURCES**

1. <http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann-2011.pdf>

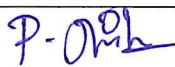


**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M	M	M	L
CO3	S	S	S	M
CO4	M	M	M	M

*S - Strong; M-Medium; L-Low.*

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 P.DEEPIKA	 Dr.R.RANGARAJ	

**Dr. R. Rangaraj**  
M.Sc. (CS), M.Phil., Ph.D., M.S. (Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP15	<b>Internet of Things</b>						<b>Batch:</b>	2020-2021 &Onwards
							<b>Semester:</b>	III	
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	5

#### COURSE OBJECTIVE

- Understand the architecture of Internet of Things and connected world.
- Learning about Machine to Machine interaction with IoT protocol standards
- Explore on use of various hardware, communication and sensing technologies to build IoT applications.
- Illustrate the real time IoT applications to make smart world via Arduino and cloud.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Enumerate the whole process line of extracting knowledge from data about the Internet of Things.	K1
CO2	Generalize deriving theoretical properties of methods involved in IoT.	K2
CO3	Choose Design and implementation/modification of methods involved in IoT to build real time applications	K3
CO4	Correlate effective results of IoT via Arduino and cloud for smart future approaches.	K4

**SYLLABUS**

20CEP15	INTERNET OF THINGS	III
Unit No.	Topics	Hours
I	<b>INTRODUCTION TO INTERNET OF THINGS (IoT):</b> Definition and characteristics of IoT- physical design of IoT- logical design of IoT - IoT enabling technologies- IoT levels and deployment- domain specific IoTs. IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.	12
II	<b>IoT AND M2M :</b> Introduction- M2M- difference between IoT and M2M- software defined networking (SDN) and network function virtualization (NFV) for IoT -M2M and IoT technology fundamentals. Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Mod bus–Zigbee Architecture – Network layer – 6LowPAN - CoAP – Security	14
III	<b>IoT PLATFORMS DESIGN METHODOLOGY&amp;IOT APPLICATIONS :</b> IoT Architecture: State of the art introduction- state of the art- Architecture reference model- Introduction- reference model and architecture- IoT reference model. Iot applications – Types of applications - Consumer application – Education application – Industrial applications – Health care applications.	14
IV	<b>IoT PHYSICAL DEVICES AND ENDPOINTS</b> Introduction to Arduino- Installing and setting up the Arduino- sketches- shields- interfacing with Arduino -Introduction to Node MCU-Programming Node MCU- RFID- GPS -Introduction to Raspberry pi- installation-usage.	13
V	<b>IoT PHYSICAL SERVERS AND CLOUD OFFERINGS</b> Introduction to cloud storage models and communication-IOT cloud building blocks- Interfacing with cloud- About Thing speak- Channels- working with thing speak.	12

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning



### TEXT BOOKS

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1st Edition, 2014.
2. Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rd Edition, 2014.

### REFERENCE BOOKS

1. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley and Sons 2014.
2. Matthew N.O Sadiku "Emerging Internet Based Technologies", Taylor & Francis (P) 2019 Taylor & Francis.

### WEB RESOURCES

1. <https://ia801208.us.archive.org/9/items/IoT5days/IoT5days.pdf>
2. <https://drive.google.com/file/d/1AR14-71ndz43bSutvLBqqfxjNc7mVkJEo/view?usp=sharing>



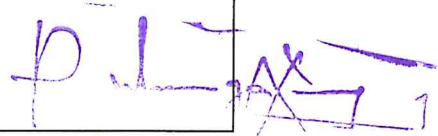
### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	M	M	M	S
CO2	M	S	M	S
CO3	S	M	M	S
CO4	M	M	M	M

*S - Strong; M-Medium; L-Low.*

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

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 M.KARTHI	 Dr.R.RANGARAJ	

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Coimbatore - 641 028.

**Co-ordinator**  
Curriculum Development Cell  
Hindusthan College of Arts & Sciences  
Coimbatore-641 028.

<b>Course Code:</b>	<b>20CEP16</b>	<b>Practical V: DIP Programming Using MAT LAB</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>-</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>5</b>	<b>Semester:</b>	<b>III</b>
								<b>Credits:</b>	<b>3</b>

### COURSE OBJECTIVE

- Acquire an appreciation for the image processing issues and techniques and be able to apply these techniques to real world problems.
- Be able to conduct independent study and analysis of image processing problems and techniques.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques.

### COURSE OUTCOMES (CO)

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	List the relevant aspects of digital image representation and their practical implications	K1
CO2	Discuss the ability to design point wise intensity transformations to meet stated specifications.	K2
CO3	Determine the underlying mechanisms of image compression, and the ability to design systems using standard algorithms to meet design specifications.	K3
CO4	Focus a command of basic image restoration techniques .	K4

## SYLLABUS

20CEP16	PRACTICAL V - DIP PROGRAMMING USING MAT LAB	III
Ex. No.	PROGRAM LIST	Hours
1.	Write a Mat lab Program for Creating Database	6
2.	Write a Mat lab Program for importing an external data set.	6
3.	Write a Mat lab Program for Basic Clustering	7
4.	Write a Mat lab Program for K- Means Clustering .	6
5.	Write a Mat lab Program for Hierarchal Clustering.	7
6.	Write a Mat lab Program for Find nearest neighbors using exhaustive search or <i>kd</i> -tree search .	6
7.	Write a Mat lab Program for Markov models for data generation.	6
8.	Write a Mat lab Program for Support vector machines for binary or multiclass classification.	7
9.	Write a Mat lab Program for Binary decision trees for multiclass learning	7
10.	Write a Mat lab Program Acquisition Using the Image Acquisition tool.	7

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

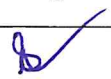

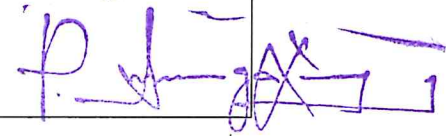
## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	M	S	S	S
CO2	S	S	M	M
CO3	M	S	S	L
CO4	S	M	S	S

*S - Strong; M-Medium; L-Low.*

## ASSESSMENT PATTERN

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**Coimbatore-641 028.**



<b>Course Code:</b>	20CEP17	<b>Practical VI: Programming the Internet of Things Lab</b>						<b>Batch:</b>	2020-2021 & Onwards
								<b>Semester:</b>	III
<b>Hrs/Week:</b>	5	L	-	T	-	P	5	<b>Credits:</b>	3

### COURSE OBJECTIVE

- Explore various components of Internet of things such as Sensors, internetworking and cyber space. In the end they will also be able to Design and implement IoT circuits and solutions.
- Explore on use of various hardware, communication and sensing technologies to build IoT applications.
- Demonstrate Arduino and its pins also Experimenting Arduino Uno.
- Illustrate the real time IoT applications to make smart world also Understanding challenges and future trends in IoT.

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Recognize various devices, sensors and applications	K1
CO2	Predict various M2M and IoT architectures	K2
CO3	Examine design issues in IoT applications	K3
CO4	Conclude IoT solutions using sensors, actuators and Devices	K4

**SYLLABUS**

20CEP17	PRACTICAL VI - PROGRAMMING THE INTERNET OF THINGS LAB	III
Ex. No.	PROGRAM LIST	Hours
1.	Introduction to various sensors and various actuators & its Application (Students have to prepare Report for the same). a) PIR MotionSensor. b) Rain DropSensor. c) MoistureSensor. d) TemperatureSensor. e) Touch Sensor. f) InfraredSensor. g) ServoMoto. h) RFIDSensor. i) BluetoothModule. j) Wi-FiModule.	7
2.	Getting Started with ESP8266 Wi-Fi SoC(wifi configuration).	6
3.	Create a simple project of study room automation using wifi.	6
4.	Global data communication using thing speak.	6
5.	Demonstrate Arduino and its pins. Case study.	6
6.	Perform Experiment using Arduino Uno to measure the distance of any object using Ultrasonic Sensor.	7
7.	Create a Program using Arduino to Learn the Working of Servo Motor	7
8.	Send a data to the web server using wifi module with arduino plat form	7
9.	Display GPS location on goggle map using thing speak	6
10.	Demonstration of Setup & Working of Raspberry Pi. (Students have to prepare the Report for the same.).	7

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
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- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

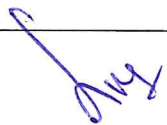

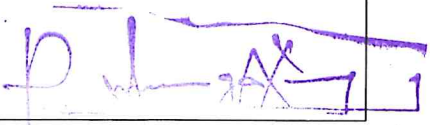
**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	S	M
CO3	S	M	S	S
CO4	M	S	M	S

*S - Strong; M-Medium; L-Low*

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Coimbatore - 641 028.

**Co-ordinator**  
**Curriculum Development Cell**  
**Hindusthan College of Arts & Science,**  
**Coimbatore-641 028.**

<b>Course Code:</b>	20CEP18A	<b>Elective -I(A) Distributed Computing</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Semester:</b>	<b>III</b>
								<b>Credits:</b>	<b>3</b>

### COURSE OBJECTIVE

- To introduce fundamental principles of distributed systems and key design issues.
- Impart knowledge of the distributed computing models algorithms and the design of distributed system.
- Understand Distributed File Systems and Distributed Shared Memory.
- Understand the importance of security in distributed systems

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Identify the core concepts of distributed systems.	K1
CO2	Illustrate the mechanisms of inter process communication in distributed systems.	K2
CO3	Establish the concurrency control mechanism in distributed transactional environment.	K3
CO4	Classify the need for mutual exclusion and election algorithms in distributed systems.	K4



## SYLLABUS

20CEP18A	<b>Elective I(A) Distributed Computing</b>	<b>III</b>
Unit No.	Topics	Hours
<b>I</b>	<b>INTRODUCTION:</b> Evolution of Distributed Computing -Issues in designing a distributed system- Challenges- Minicomputer model – Workstation model - Workstation-Server model–Processor - pool model - Trends in distributed systems	<b>13</b>
<b>II</b>	<b>System models:</b> Physical models - Architectural models -Fundamental models <b>Inter process communication:</b> characteristics-Group Communication-Multicast Communication –Remote Procedure call - Network virtualization.	<b>13</b>
<b>III</b>	<b>Distributed file system:</b> File service architecture – Network file system- Andrew file system- Name Service.	<b>13</b>
<b>IV</b>	<b>Transactional concurrency control:</b> Transactions, Nested transactions-Locks-Optimistic concurrency control .	<b>13</b>
<b>V</b>	<b>Mutual Exclusion:</b> Distributed mutual exclusion – central server algorithm – ring based algorithm- Maekawa's voting algorithm – <b>Election:</b> Ring -based election algorithm – Bully algorithm	<b>13</b>

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. George Coulouris, Jean Dollimore and Tim Kindberg, *Distributed Systems: concepts and Design*, Fifth Edition, Pearson Education, 2011
2. Pradeep K Sinha, *Distributed Operating Systems : Concepts and Design*, Prentice Hall of India

### REFERENCE BOOKS

1. A S Tanenbaum and M V Steen, *Distributed Systems: Principles and paradigms*, Pearson Education, 2007
2. M Solomon and J Krammer, *Distributed Systems and Computer Networks*, PHI.

### WEB RESOURCES

1. [https://drive.google.com/file/d/1YKYz6YguoMv\\_HLZ9RkoqwnldxqEstKH6/view?usp=sharing](https://drive.google.com/file/d/1YKYz6YguoMv_HLZ9RkoqwnldxqEstKH6/view?usp=sharing)
2. <https://eclass.uoa.gr/modules/document/file.php/D245/2015/DistrComp.pdf>



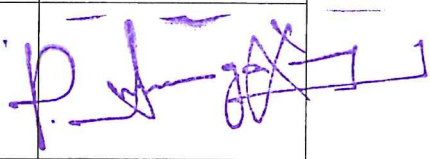
### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	L
CO2	S	S	S	L
CO3	S	S	S	L
CO4	S	S	S	M

S - Strong; M-Medium; L-Low.

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	
 S.SASIKALA	 Dr.R.RANGARAJ	

**Dr.R.Rangaraj**  
M.Sc.(CS), M.Phil., Ph.D., M.Sc(P.T.)  
Professor & Head,  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science  
Coimbatore - 641 028.

**Co-ordinator**  
**Academic Audit Cell**  
**Hindusthan College of Arts & Science,**  
**Coimbatore-641 028.**

<b>Course Code:</b>	20CEP18B	<b>Elective-II(B) Web Technology</b>						<b>Batch:</b>	2020-2021 &Onwards
							<b>Semester:</b>	III	
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	3

### COURSE OBJECTIVE

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Style Sheets.
- Build dynamic web pages using JavaScript (Client side programming).
- Create XML documents and Schemas.

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Observe to design a dynamic webpage.	K1
CO2	Observe and understand about different type of scripting languages and use it to develop websites.	K2
CO3	Apply the skill to develop applications using various scripting languages.	K3
CO4	Analyze to create structure of web page, to store the data in web document, and transport information through web.	K4

**SYLLABUS**

20CEP18B	Elective I(B): WEB TECHNOLOGY	III
Unit No.	Topics	Hours
I	<b>HTML:</b> Introduction to HTML: The development process, Html tags and simple HTML forms, web site structure Introduction to XHTML: XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser. Web Design: Website design principles, planning the site and navigation.	13
II	<b>Java Script:</b> Client side scripting, What is Java script, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition. Advance script, Java script and objects, Java Script own objects, the DOM and web browser environments, forms and validations.	13
III	<b>XML:</b> Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements.	12
IV	<b>PHP:</b> Starting to script on server side, Arrays, function and forms, advance PHP Databases :Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creatingtable,insertingdata,alteringtables,queries,deletingdatabase,deleting data and tables.	14
V	<b>Introduction to Servlets:</b> Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a Servlet, The Servlet API, Reading Servlet parameters and Reading Initialization parameters, Handling Http Request & Responses Using Cookies and Sessions, connecting to a database using JDBC.	13



### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. Steven Holzner, "HTML Black Book", Dream tech press.
2. Web Technologies, Black Book, Dream tech Press.
3. Web Technologies, Uttam K Roy, Oxford University Press.
4. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dream tech.
5. The Complete Reference PHP – Steven Holzner, Tata McGrawHill.
6. Java Server Pages –Hans Bergsten, SPDO'Reilly.

### REFERENCE BOOKS

1. Web Applications: Concepts and Real World Design, Knuckles,
2. Wiley-India. 2. Internet and World Wide Web How to program P.J. Deitel & H.M. Deitel Pearson.

### WEB RESOURCES

1. <https://www.w3schools.com/>
2. <https://www.w3schools.com/php/DEFAULT.asp>
3. <https://www.tutorialspoint.com/servlets/>



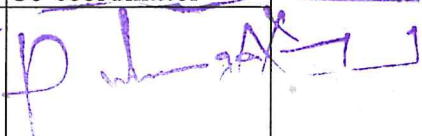
### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	S	S	S
CO3	S	M	M	S
CO4	M	S	M	S

S - Strong; M-Medium; L-Low.

### ASSESSMENT PATTERN

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 V.DEEPA	 Dr.R.RANGARAJ	

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M.Sc.(CS), M.Phil., Ph.D., M.C.A. (Psy).  
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Coimbatore

<b>Course Code:</b>	<b>20CEP18C</b>	<b>Data Analytics</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	<b>5</b>							<b>L</b>	<b>5</b>
								<b>Credits:</b>	<b>3</b>

### COURSE OBJECTIVE

- Introduce the students to data science, big data & its eco system.
- Learn data analytics & its life cycle.
- To explore the programming language R, with respect to the data mining algorithms
- Relate the relationship between artificial intelligence, machine learning and data science.

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Observe the concept of data science and its techniques	K1
CO2	Estimate data analytics	K2
CO3	Apply and determine appropriate Data Mining techniques using R to real time applications	K3
CO4	Analyze on clustering algorithms	K4

## SYLLABUS

20CEP18C	Data Analytics	III
Unit No.	Topics	Hours
I	Introduction of Data science: Data Science and Big Data- facets of data – Data science Process- Ecosystem- The Data Science Process- Six Steps- Machine Learning	11
II	Basics of Data Analytics: Data Analytics life cycle - review of data analytics - Advanced data Analytics-technology and tools.	12
III	DATA ANALYTICS USING R: Basic Data Analytics using R : R Graphical User Interfaces – Data Import and Export – Attribute and Data Types – Descriptive Statistics – Exploratory Data Analysis – Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation.	15
IV	CLUSTERING: Overview of Clustering : K-means – Use Cases – Overview of the Method – Perform a K-means Analysis using R – Classification – Decision Trees – Overview of a Decision Tree – Decision Tree Algorithms – Evaluating a Decision Tree – Decision Tree in R – Bayes’ Theorem – Naïve Bayes Classifier – Smoothing – Naïve Bayes in R	15
V	ARTIFICIAL INTELLIGENCE: Artificial intelligence: Machine Learning and deep learning in data science - Clustering, association rules. Linear regression-logistic regression-Additional regression methods.	12

**Teaching methods:**

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- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning



### TEXT BOOKS

1. *Introducing-Data-Science-Big-Data-Machine-Learning-and-more-using-Python-tools-2016. Pdf*
2. *Data science in big data analytics-Wiley 2015 John Wiley & Sons*

### REFERENCE BOOKS

1. *A simple introduction to Data Science - Lars Nielson 2015*
2. *Introducing Data Science Davy Cielen, Arno D.B.Meysman, Mohamed Ali 2016 Manning Publication*
3. *R Programming for Data Science - Roger D.Peng 2015 Lean Publication*
4. *Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*

### WEB RESOURCES

1. [https://www.tutorialspoint.com/python\\_data\\_science/index.htm](https://www.tutorialspoint.com/python_data_science/index.htm)
2. <https://www.javatpoint.com/data-science>
3. <https://nptel.ac.in/courses/106/106/106106179/>

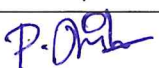

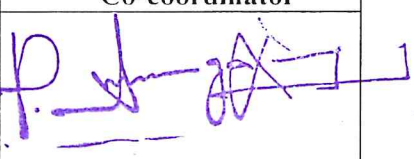
### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	S	S	S
CO4	M	S	S	S

*S - Strong; M-Medium; L-Low.*

### ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 P.DEEPIKA	 Dr.R.RANGARAJ	

**Dr.R.Rangaraj**  
M.Sc.(CS), M.Phil., Ph.D., M.Sc(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
Academic Audit Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP19	<b>Big Data Analytics</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Semester:</b>	<b>IV</b>
								<b>Credits:</b>	<b>4</b>

#### COURSE OBJECTIVE

- Explore the fundamental concepts of big data analytics
- Learn to analyze the big data using intelligent techniques.
- Understand the Software Tools with the help of R language
- Understand the various models and mathematical approaches for data analytics

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME BLOOMS LEVEL	BLOOMS LEVEL
CO1	Recognize intuition of the Big data handler, Software tools and algorithms.	K1
CO2	Illustrate deriving theoretical properties of Security, Compliance, Auditing, and Protection	K2
CO3	Apply the big data using mathematical approaches.	K3
CO4	Analysing data science using trending techniques.	K4

**SYLLABUS**

20CEP19	BIG DATA ANALYTICS	IV
Unit No.	Topics	Hours
I	Introduction - History of Big Data / Data Science - Google White papers - Map Reduce - Google File system - clusters . <b>Big data handlers</b> - SPSS - SAS <b>Introduction about Software Tools</b> - Mongo DB - R - Hadoop - Hadoop Ecosystem - What makes it Big Data .What is Data science - Tools in Data Science - Type of Data Analytics - I/O issues - Big data usage - Future of Big Data . <b>Algorithms in Big Data</b> - Classification - Predictive learning - Deterministic behavior algorithms	13
II	<b>Security, Compliance, Auditing, and Protection</b> : Pragmatic Steps to Securing Big Data - Classifying Data - Protecting Big Data Analytics - Big Data and Compliance - The Intellectual Property Challenge	13
III	<b>Software Tools</b> : Overview of R - Installing R - Built in Datasets - Data Imports - Creating Charts and Graphs - Creating histograms and box plots - Frequencies and Descriptive - Transformation of Variables - Coding missing data .	13
IV	<b>Mathematical Approach to Data Science</b> : Decision Trees - Tree based methods - creating a decision tree in R - Rules - r part - R packages.	12
V	<b>Statistical Approach in Data Science</b> : Regression - Trees - Classification - Diagnostics - Descriptive vs inferential statistics - Basic measures of Central tendency - Relationships - basic measures of central tendency using R- Linear Models - Least Squares methods - Creating and Using Linear Models with the Least Squares methods and its implementation in R.	14

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", Morgan Kaufmann/El sevier Publishers, 2013.

**REFERENCE BOOKS**

1. EMC Education Services, "Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley publishers, 2015.
2. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley Publishers, 2015.
3. Dietmar Jannach and Markus Zanker, "Recommender Systems: An Introduction", Cambridge University Press, 2010.

**WEB RESOURCES**

1. [http://www.bdbanalytics.ir/media/1121/big-data-analytics\\_turning-big-data-into-big-money.pdf](http://www.bdbanalytics.ir/media/1121/big-data-analytics_turning-big-data-into-big-money.pdf)
2. [https://www.tutorialspoint.com/big\\_data\\_analytics/index.htm](https://www.tutorialspoint.com/big_data_analytics/index.htm)



## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	S	M	S	M
CO3	S	S	M	S
CO4	S	S	S	M

*S - Strong; M-Medium; L-Low.*

## ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
K.S.SENTHILKUMAR	Dr.R.RANGARAJ	

**Dr.R.Rangaraj**  
M.Sc.(CS),M.Phil.,Ph.D.(M.Sc.Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
**Curriculum Development Cell**  
**Hindusthan College of Arts & Science,**  
**Coimbatore-641 028.**

<b>Course Code:</b>	<b>20CEP20</b>	<b>Research Methodology</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>IV</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>5</b>

#### **COURSE OBJECTIVE**

- Achieve competence and proficiency in the theory of and practice to research
- Encourage the formation of higher level of trained intellectual ability
- Develop skills in writing research proposals, reports and dissertation.
- Appreciate the components of scholarly writing and evaluate its quality

#### **COURSE OUTCOMES (CO)**

<b>S.No</b>	<b>COURSE OUTCOME</b>	<b>BLOOMS LEVEL</b>
CO1	List awareness of crucial aspect of the nature of Knowledge and the value of scientific method	K1
CO2	Observe literature, from a variety of sources, pertinent to the research objectives	K2
CO3	Choose the concepts of IPR	K3
CO4	Analysing common mistakes in the field of research methodology	K4

**SYLLABUS**

20CEP20	RESEARCH METHODOLOGY	IV
Unit No.	Topics	Hours
I	<p><b>RESEARCH FORMULATION AND DESIGN</b>                      Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Scope and objectives of research problem, Identification of research problem, Errors in selecting a research problem,. Approaches of investigation for research problem - Research Design - Types - Review of Literature.</p>	13
II	<p><b>DATA COLLECTION AND ANALYSIS</b>                      Data Collection - types of data - tools of data collection - method of validation, Sampling design - meaning - sampling methods. Data processing and analysis strategies and tools - data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), Hypothesis -meaning - types - formulation of hypothesis and testing.</p>	13
III	<p><b>RESEARCH PROPOSAL AND ETHICS</b>                      Effective literature studies approaches, analysis of Plagiarism, Research ethics, Impact factor - Validity, Merits, limitations. Other measurements of impact: h-index-advantages, criticism of h-index-modification of h-index. Q-index - introduction - advantages. Web of Science - introduction - advantages</p>	13
IV	<p><b>GUIDELINES FOR WRITING A THESIS:</b>                      Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript., Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.</p>	13
V	<p><b>INTELLECTUAL PROPERTY:</b>                      Intellectual property rights (IPR) - forms of IPR- Patents, Designs, Trademarks and Copyright- Industrial design-geographical indication. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.  <b>FUNDING AGENCIES AND RESEARCH GRANTS</b>                      Introduction to various research funding agencies such as-DST, DBT, AICTE, UGC, CSIR, ICMR, AAYUSH, and DRDO along with their functions in India. Writing a research project and procurement of research grants.</p>	13

### **Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### **TEXT BOOKS**

1. Garg B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. *An introduction to Research Methodology*, RBSA Publishers.
2. Wadehra, B.L. 2000. *Law relating to patents, trade marks, copyright designs and geographical indications*. Universal Law Publishing.
3. Dr. Shanti Bhushan Mishra Dr. Shashi Alok, "Handbook of Research Methodology" EDUCREATION PUBLISHING, 2015 edition.

### **REFERENCE BOOKS**

1. Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. *Research Methods: A Process of Inquiry*, Allyn and Bacon.
2. Carlos, C.M., 2000. *Intellectual property rights, the WTO and developing countries: the TRIPS agreement and policy options*. Zed Books, New York.
3. Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
4. Day, R.A., 1992. *How to Write and Publish a Scientific Paper*, Cambridge University Press.
5. Fink, A., 2009. *Conducting Research Literature Reviews: From the Internet to Paper*. Sage Publications
6. Leedy, P.D. and Ormrod, J.E., 2004 *Practical Research: Planning and Design*, Prentice Hall.
7. Satarkar, S.V., 2000. *Intellectual property rights and Copy right*. EssEss Publications.
8. [https://www.researchgate.net/publication/319207471\\_HANDBOOK\\_OF\\_RESEARCH\\_METHODODOLOGY](https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODODOLOGY)

### **WEB RESOURCES**

1. [https://www.cusb.ac.in/images/cusbfiles/2020/el/cbs/MCCOM2003C04%20\(Business%20Research%20Methods\)Research\\_Methodology\\_C\\_R\\_Kothari.pdf](https://www.cusb.ac.in/images/cusbfiles/2020/el/cbs/MCCOM2003C04%20(Business%20Research%20Methods)Research_Methodology_C_R_Kothari.pdf)



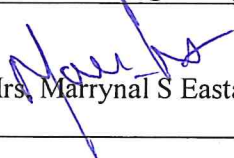

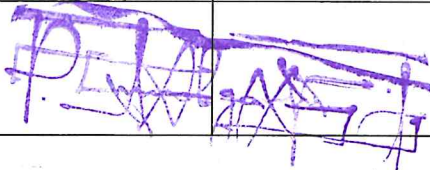
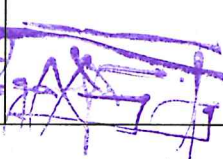
## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	M
CO2	M	S	S	M
CO3	M	S	S	M
CO4	M	M	S	M

*S - Strong; M- Medium; L-Low.*

## ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations

Course Designed by	Verified by HOD	Checked by	Approved by
 Mrs. Marraynal S Eastaff	 Dr. R. RANGARAJ		

**Dr. R. Rangaraj**  
M. Sc. (CS), M. Phil., Ph. D., M. Soc. (Psy).  
Professor & Head, PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
**Curriculum Development Cell**  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

<b>Course Code:</b>	20CEP21	<b>Practical VII: Big Data Analytics Using R Tool</b>						<b>Batch:</b>	<b>2020-2021 &amp; Onwards</b>
							<b>Semester:</b>	<b>IV</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>-</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>5</b>	<b>Credits:</b>	<b>3</b>

#### COURSE OBJECTIVE

- To explore the statistical analysis techniques using R programming languages.
- Experiencing the R language to use it for further research
- Analysing statistical techniques on variety of data
- Evaluating the collected data with different types of algorithms

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	List out optimize business decisions and create competitive advantage with Big Data analytics	K1
CO2	Estimate statistical analysis techniques for solving practical problems.	K2
CO3	Examine statistical analysis on variety of data	K3
CO4	Classify appropriate statistical tests using R and visualize the outcome	K4

**SYLLABUS**

20CEP21	Practical VII - BIG DATA ANALYTICS USING R TOOL	IV
Ex. No.	PROGRAM LIST	Hours
1.	Write a R program to find the levels of factor of a given vector	7
2.	Write a R program to extract the five of the levels of factor created from a random sample from the LETTERS (Part of the base R distribution)	8
3.	Write a R program to call the (built-in) dataset air quality. Remove the variables 'Solar R' and 'Wind' and display the data frame	8
4.	Write a R program to create two 2x3 matrix and add, subtract, multiply and divide the matrixes.	8
5.	Implement a central limit theorem using R	9
6.	Demonstrate Apriori algorithm using R	8
7.	Implementation of KNN algorithm using R	9
8.	Demonstrate a Decision Tree algorithm using R	8

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	S	L
CO2	S	S	S	L
CO3	S	S	S	L
CO4	S	S	S	M

*S - Strong; M-Medium; L-Low*

## ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
K.S.SENTHILKUMAR	Dr.R.RANGARAJ	

Dr. R. Rangaraj  
M.Sc.(CS), M.Phil., Ph.D., M.Ed. (Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science



<b>Course Code:</b>	20CEP22A	<b>Elective II(A) Business Intelligence</b>						<b>Batch:</b>	2020-2021 &Onwards
								<b>Semester:</b>	IV
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	3

**COURSE OBJECTIVE:**

- Understood the industry and overall business environment.
- Evaluate the technologies that make up BI
- Identify the technological architecture that makes up BI systems
- Plan the implementation of a BI system

**COURSE OUTCOMES (CO)**

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Examine to learn about the foundations, definitions, and capabilities of DSS, data analytics and BI	K1
CO2	Discuss the Knowledge about the impact of business reporting, information visualization, and dashboards.	K2
CO3	Illustrate a working knowledge of how to plan, execute and close business to required standards	K3
CO4	Apply a range of proprietary and non- proprietary management tools to carry out and report on your team projects	K4

**SYLLABUS**

20CEP22A	Elective I(A):BUSINESS INTELLIGENCE	IV
Unit No.	Topics	Hours
I	<b>INTRODUCTION TO BUSINESS INTELLIGENCE:</b> Introduction – Data Information and Knowledge – What is Business intelligence? – Business Intelligence and related technologies – Obstacles to Business Intelligence – Factors driving Business Intelligence – Improving the Decision making Process – Why a Business intelligence Program?.	13
II	<b>BUSINESS INTELLIGENCE CAPABILITIES:</b> Introduction – Four Synergistic capabilities – Organizational Memory – Technologies Enabling Organizational Memory Capability - Information Integration Capability – Insight Creation – Technologies Enabling Insight Creation Capability.	12
III	<b>THE BUSINESS INTELLIGENCE PROGRAM:</b> Business Intelligence Architecture and Design – Data Preparation – Data Integration – Business Intelligence Platforms – Analysis – Delivery and Presentation - The Organizational Business Framework – Metadata management – Data Modeling – Data Profiling – Data Quality – Data Integration – Text Analysis – Predictive Analysis – Data Security - Data Governance.	13
IV	<b>BUSINESS PROCESSES AND INFORMATION FLOW:</b> Information Processing and Information flow – Transaction Processing – operational Processing – Batch Processing – Analytical Processing - The Information Flow Process : Information flow model : Processing Stages - Directed Channels - Business Process Model and Notation (BPMN) – Data Recruitment Analysis : Business Use of Information – Metrics : Facts , Qualifiers and Models – What is Data Requirements Analysis ?	14
V	<b>EMERGING BUSINESS INTELLIGENCE TRENDS AND KNOWLEDGE DELIVERY:</b> Introduction in Searching a Business Intelligence Technique – Text Analysis– Entity Extraction and Entity Recognition–Sentiment Analysis– Mobile Business Intelligence – Event Stream Processing – Big Data Analytics - Knowledge Delivery : Standard Reports –Dimensional Analysis – Visualization: Charts, Graphs, Widgets – Score cards and Dashboards – Geographic visualization – Integrated Analytics.	13

**Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

**TEXT BOOKS**

1. *Business Intelligence, Practice, Technologies and Management*, Rajiv Sabherwal, Irma cerra Fernandez.
2. *Business Intelligence: The Savvy Manager's Guide*, David Loshin , 2013Edition,2010.

**REFERENCE BOOKS**

1. *Fundamental of Business Intelligence*, Grossmann W, Rinderle-Ma, 1st Edition, 2015

**WEB RESOURCES**

1. <https://www.guru99.com/business-intelligence-definition-example.html>

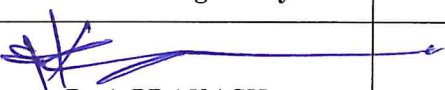


**MAPPING WITH PROGRAM OUTCOMES**

CO \ PO	PO	PO1	PO2	PO3	PO4
CO1		S	S	L	L
CO2		S	S	S	S
CO3		M	S	S	S
CO4		S	S	S	M

S-Strong, M- Medium, L – Low

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Dr A.PRAKASH	 Dr.R.BANGARAJ	

**Dr.R.Bangaraj**  
M.Sc.(CS),M.Phil.,Ph.D.,M.Ed.(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
**Curriculum Development Cell**  
**Hindusthan College of Arts & Science,**  
**Coimbatore-641 028.**



<b>Course Code:</b>	20CEP22B	Elective II(B):E-Commerce						<b>Batch:</b>	2020-2021 &Onwards
								<b>Semester:</b>	IV
<b>Hrs/Week:</b>	5	L	5	T	-	P	-	<b>Credits:</b>	3

#### COURSE OBJECTIVE

- To provide exposure to the students about business through information technology.
- To provide them with the fundamental knowledge of the use of computers in business.
- Identify and apply relevant problem solving methodologies
- Communicate effectively in ways appropriate to the discipline, audience and purpose.

#### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	State the methodology for online business	K1
CO2	Estimate digital transaction using e-commerce infrastructure.	K2
CO3	Determine strategic approach to define how mobile phones can be integrated into marketing strategy in organizations.	K3
CO4	Advertise electronic data flow in organization	K4

## SYLLABUS

20CEP22B	Elective II(B) E-COMMERCE	IV
Unit No.	Topics	Hours
I	<b>Electronic commerce fundamentals:</b> History and basic idea of EDI and electronic messaging, definition of e-commerce; administration, business, and consumer models of e-commerce; e-commerce enablers- cost reduction, trust issues, products, processes, and markets. Client-server computing in e-commerce Client-server computing basics, design technologies	14
II	<b>Core Technology:</b> Electronic Commerce Models -Shopping Cart Technology - Data Mining - Intelligent Agents – Internet Marketing - XML and E-Commerce	12
III	<b>Electronic Payment Systems:</b> Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Smart Card and Credit Card Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems.	13
IV	<b>Security:</b> Threats to Network Security - Public Key Cryptography - Secured Sockets Layer - Secure Electronic Transaction - Network Security Solutions - Firewalls	11
V	<b>Inter/Intra Organizations Electronic Commerce:</b> EDI - EDI application in business - legal, Security and Privacy issues - EDI and Electronic commerce - Standards - Internal Information Systems - Macro forces - Internal commerce - Workflow Automation and Coordination - Customization and Internal commerce - Supply chain Management	15

Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### TEXT BOOKS

1. Laudon, K. C. & Traver, C. G.; *E-Commerce Business, Technology, Society*; Addison Wesley, 2014
2. Ravi Kalakota and Andrew B Whinston, *Frontiers of Electronic commerce*, 50 Pearson Education, 2003.

### REFERENCE BOOKS

1. David Whiteley, *e - Commerce : Strategy, Technologies and Applications* - McGraw Hill, 2000.
2. *E-Commerce*, M.M. Oka, EPH 2. Kalakotia, Whinston : *Frontiers of Electronic Commerce*, Pearson Education.

### WEB RESOURCES

1. <https://www.geeksforgeeks.org/e-commerce/>
2. [https://www.tutorialspoint.com/basics\\_of\\_computer\\_science/basics\\_of\\_computer\\_science\\_electronic\\_commerce.htm](https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_electronic_commerce.htm)



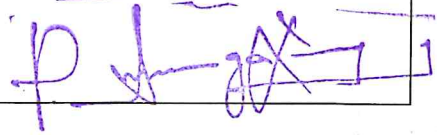
### MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	S	M	S
CO2	M	M	M	M
CO3	S	S	S	M
CO4	M	M	M	M

S-Strong, M- Medium, L – Low

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 S.LAKSHMIPRIYA	 Dr.R.RANGARAJ	

Dr. R. Rangaraj  
M.Sc.(CS), M.Phil., Ph.D., M.Ed. (Sy)  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.



<b>Course Code:</b>	<b>20CEP22C</b>	<b>Elective II(C):Software Testing</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
							<b>Semester:</b>	<b>IV</b>	
<b>Hrs/Week:</b>	<b>5</b>	<b>L</b>	<b>5</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Credits:</b>	<b>3</b>

### COURSE OBJECTIVE

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- Learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- Expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- Gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	List out software test automation problems and solutions.	K1
CO2	Compare software testing documents, and communicate with engineers in various forms.	K2
CO3	Articulate the techniques and skills on how to use modern software testing tools to support software testing projects.	K3
CO4	Experiment software testing knowledge and methods to practice-oriented software testing projects.	K4

**SYLLABUS**

20CEP22C	Elective II(C):Software Testing	I
Unit No.	Topics	Hours
I	Introduction to Quality: Introduction - Historical Perspective of Quality - Definitions of Quality - Core Components of Quality - Quality View - Customer, Suppliers and Processes - The Purpose of Testing. Basic Concepts of Software Testing: Introduction - Definition of Testing - Basic Principles of Testing - Work Bench - Test Policy - Test Strategy - Developing Test Strategy - Test Methodologies.	13
II	Configuration Management: Introduction - Configuration Management - Cycle of Configuration Management - Using Automated Configuration Tools Configuration Management Planning. Risk Analysis: Introduction - Advantages and Disadvantages of Automated System - Risk - Constraints - Project Risk - Product Risk Software Implementation Risk - Identification of Risk - Types Software Risk - Flow graphs and Path Testing.	13
III	Software Verification And Validation: Introduction - Verification - Verification Work Bench - Methods Of Verification - Types Of Review On The Basis Of Stage/Phase - Coverage In Verification - Concerns of Verification - Validation - Work Bench - Levels - Acceptance Testing - Software Development Verification And Validation Activities. V-Test Model - Analyzing and reporting Test Results.	13
IV	Testing Techniques And Tools: Levels of Testing - Acceptance Testing: Introduction - Acceptance Criteria - Importance of Acceptance Criteria - Alpha Testing - Beta Testing - Gamma Testing - Acceptance Testing During Each Phase of Software Development - Software Development Methodologies - Developing Acceptance Plan	13
V	Testing Tools - Test Planning - Test Metrics and Test Reports - Qualitative and Quantitative Analysis.	13

### **Teaching methods:**

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

### **TEXT BOOKS**

1. *M G Limaye, "Software Testing Principles, Techniques and Tools", Tata McGraw Hill Companies.*
2. *Boris Beizer, "Software Testing Techniques", Dream Tech Press, Second Edition – 2003.*
3. *William E.Perry "Effective Methods for Software Testing "Wiley INDIA Third Edition.*

### **REFERENCE BOOKS**

1. *Ron Patton, —Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007.*
2. *Marnie.l.hutcheson. "Software testing fundamentals", wily-India, 2007.*
3. *Srinivasan desikan & Gopalaswamy, "software testing principles and practices, 1st edition, 2006.*
4. *Nageswara rao pusuluri, "software testing concepts and tools", 1st edition, 2008.*

### **WEB RESOURCES**

1. <http://www.guru99.com/software-testing-books.html>




## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
C01	S	S	S	S
C02	S	L	M	S
C03	S	M	M	M
C04	L	M	M	S

*S - Strong; M-Medium; L-Low.*

## ASSESSMENT PATTERN

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 SANGEETHA.V	 Dr.R.RANGARAJ	

Dr.R.Rangaraj  
M.Sc.(CS),M.Phil.,Ph.D.(Psychology).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

Co-ordinator  
Curriculum Development Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.



<b>Course Code:</b>	<b>20CEPV03</b>	<b>Master Web Designing in Photoshop</b>						<b>Batch:</b>	<b>2020-2021 &amp;Onwards</b>
<b>Hrs/Week:</b>	<b>2</b>	<b>L</b>	<b>2</b>	<b>T</b>	<b>-</b>	<b>P</b>	<b>-</b>	<b>Semester:</b>	<b>III</b>
								<b>Credits:</b>	<b>1</b>

### COURSE OBJECTIVE

- Demonstrating contested definitions of the adobe Illustrator user interface
- Exploring debates about the Adobe via tools within the emerging field
- Understanding and customizing the workspace
- Through hands-on experimentation, trying out painting

### COURSE OUTCOMES (CO)

S.No	COURSE OUTCOME	BLOOMS LEVEL
CO1	Select elements of the adobe Illustrator user interface and demonstrating knowledge of their functions.	K1
CO2	Discover knowledge of how to work with brushes, symbols, graphic styles, and patterns.	K2
CO3	Manipulate Color Tools and Shape tools	K3
CO4	Connect the ideas of drawing and shape tools	K4

### Teaching methods:

- Use of multi-media/AV (Audio-Visual)/ICT
- Flipped Learning and Flipped Classroom
- Active Learning Forums
- Usage of Projectors
- Inquiry-based learning through quizzing, MCQs, etc.
- Student seminars and workshops
- Availability of E-resources
- Group Discussions, Group learning-Assignments and Cooperative learning

## SYLLABUS

20CEPV03	Master Web Designing in Photoshop	Sem: III
Unit No.	Topics	Hours
I	Workspace: Workspace Basics-Workspace overview-Customizing the workspace-Tools: Tool Panel Overview-Improved User Interface -Tool Galleries-Files and Templates-Using multiple-Art boards-Viewing Artwork.	8
II	Drawing Basics-Drawing simple lines and shapes-Drawing Pixel aligned paths for web Workflows-Drawing with the pen, Pencil or Flare tool-Editing Paths-Adjust Path Segments-Symbolism tools and symbol sets-Symbols.	8
III	Selecting Colors-Using and creating swatches-Color groups-Create color themes with kuler-Adjusting Colors. Painting: Painting with fills strokes-Live Paint groups-Brushes-Gradients-Meshes-Patterns.	10

## TEXT BOOKS

1. Adobe Illustrator CC Classroom in a Book, 1edition, Pearson Education India.
2. Adobe Illustrator CC Classroom in a Book (2017 release) 1st Edition

## REFERENCE BOOKS

1. Adobe Illustrator CS6 Classroom in a Book by adobe create team

## WEB RESOURCES

1. <https://www.goodreads.com/book/show/14786149-adobe-illustrator-cs6-classroom-in-a-book>

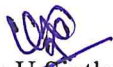

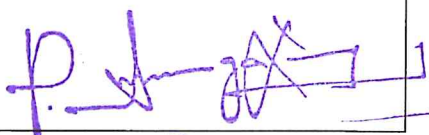
## MAPPING WITH PROGRAM OUTCOMES

CO \ PO	PO1	PO2	PO3	PO4
CO1	S	M	L	S
CO2	M	M	L	M
CO3	S	L	S	M
CO4	M	L	M	S

S-Strong, M- Medium, L – Low

**ASSESSMENT PATTERN**

Follows common pattern of Internal and External assessment, suggested in the Regulations.

Course Designed by	Verified by HOD	Approved by CDC Co-coordinator
 Ms.U.Sinthuja	 Dr.R.RANGARAJ	

**Dr.R.Rangaraj**  
M.Sc.(CS),M.Phil.,Ph.D.,M.Sc(Psy).  
Professor & Head,  
PG & Research Dept. of Computer Science,  
Hindusthan College of Arts & Science,  
Coimbatore - 641 028.

**Co-ordinator**  
Academic Audit Cell  
Hindusthan College of Arts & Science,  
Coimbatore-641 028.

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COMPTON  
College of Arts & Sciences  
Academic Affairs  
1000 University Ave.  
Compton, CA 90221