

**GOVERNMENT ARTS COLLEGE (Autonomous),**  
(Re-accredited with 'A' Grade by NAAC and Affiliated to Bharathidasan University, Tiruchirappalli)

**KARUR - 639 005.**



**PG**

**COURSE STRUCTURE**

**Course Structure under CBCS System**

(Applicable to the Candidates admitted from the Academic Year **2021 - 2022** onwards)

**M.Sc.,**

**COMPUTER SCIENCE**

# **GOVERNMENT ARTS COLLEGE (Autonomous),**

**KARUR - 639 005**

## **Course structure under CBCS system**

### **POSTGRADUATE COURSES**

#### **ABOUT THE DEPARTMENT OF COMPUTER SCIENCE**

1. Computer Science Department was started in the academic year 1988-89.
2. It is notable that the Computer Science Course (B.Sc) with co-education (1988-89) in Tamil Nadu was first started in our college only.
3. In the academic year 2007-2008 another B.Sc Computer Science (Shift II) was started as Per the Tamil Nadu Government Order.
4. In the academic year 2004-2005 Post Graduate course (M.Sc) was started.
5. The sanctioned strength is 60 (30 + 30) for under graduate Programmes and 30 for post Graduate Programme.
6. Research Programmes such as M.Phil and Ph.D was started in the year 2011-2012 Academic year.
7. Full time and Part time research Programmes are offered and it was approved by Government of Tamil Nadu and Bharathidasan University, Tiruchirapalli, with sanctioned Strength of 25 for M.Phil and 16 for Ph.D.
8. The Department is functioning successfully with Eight regular staff members and Four Guest lecturers.

### **GOVERNMENT ARTS COLLEGE (AUTONOMOUS)**

#### **VISION**

It is our vision to persuade every mind in this temple of learning to tirelessly seek the truth to face the challenges of the times and honestly participate in the establishment of universal peace, progress and love.

#### **MISSION**

It is our mission to create in everyone an honest searching mind to be ready for value-based creative citizenship for regional, national and global peace and progress.

### **PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE**

#### **VISION**

To establish as the best conducive environment for quality, academic and research oriented UG and PG education in computer science and to groom the student for an exhaustive technological society making them to acclimatize towards serving the society.

#### **MISSION**

1. To promulgate best quality professional training at the UG and PG level with the prominence On basic principles of computer science.
2. To authenticate nationally and internationally recognise research centres and expose the Students to broad research experience.
3. To delicate the students with the mandatory skills to resolve the complex technological problem of modern society and also to accomplish there with a schema for promoting collaborative and multi-disciplinary activities.

## What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses, a student must earn a minimum of **90 (+4)** credits as mentioned in the table below. The total number of minimum courses offered by a department is given in the course pattern.

### POST GRADUATE COURSE PATTERN (2021 ONWARDS)

PART	SEMESTER	SPECIFICATION	NO. OF COURSES	HOURS	CREDITS	TOTAL CREDITS
III	I - IV	Core courses Theory	10	58	48	48
	I - IV	Core Course Practical	4	24	18	18
	I - IV	Elective Course	5	28	21	21
IV	III	Extra Credit Course (MOOC)	1	-	2	(2)
	IV	Project Work	1	10	3	3
	II	Internship Programme		-	2	(2)
<b>TOTAL</b>				<b>120</b>	<b>90 (+4)</b>	<b>90 (+4)</b>

### Course Pattern

The Postgraduate degree course consists of five vital components. They are as follows:

**Part - III:** Core Course (Theory) (Practical), Core Elective Course

**Part - IV:** Extra Credit Course, Project Work

**Part – II:** Internship Programme

### Core Courses

A core course is the course offered by the parent department related to the major subjects, components like theories, practical's, Project work, field visits and etc.

### Core Elective

The core elective course is also offered by the parent department. The objective is to provide choice and flexibility within the department. There are THREE core electives. They are offered in different semesters according to the choice of the college.

## Extra Credit Courses

In order to facilitate the students gaining extra credits, the extra credit courses are given. There are two extra credit courses - Massive Open Online Courses (MOOC) and Skill-based Course - offered in the III and V Semesters respectively. According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the MOOC provided by various portals such as SWAYAM, NPTEL, etc. Skill based course is offered by the department apart from their regular class hours.

## Subject Code Fixation

The following code system (11 characters) is adopted for Under Graduate courses:

Year of Revision	UG Code of the Dept	Semester	Specification of Part	Running number in the part
↓	↓	↓	↓	↓
<b>21</b>	<b>P21</b>	<b>x</b>	<b>x</b>	<b>xx</b>
<b>21</b>	<b>PCS</b>	<b>1</b>	<b>x</b>	<b>1</b>

For example:

**I M.Sc - Advanced Java Programming,**

The code of the paper is **P21 CS 1C1.**

Thus, the subject code is fixed for other subjects.

## EXAMINATION

### Continuous Internal Assessment (CIA):

PG - Distribution of CIA Marks	
Passing Minimum: 50 Marks	
THEORY CIA MAXIMUM = 25	THEORY CIA MINIMUM = 10
PRACTICAL CIA MAXIMUM = 40	PRACTICAL CIA MINIMUM = 16

### End - Semester Tests

Centralized - Conducted by the office of Controller of Examinations.

### Semester Examination

Testing with Objective and Descriptive questions.

**Section - A:** 10 Questions x 2 Marks = 20 Marks (No Choice - Two questions from each unit)

**Section - B:** 5 Questions x 5 Marks = 25 Marks (Either... or Type - One pair from each unit)

**Section - C:** 3 Questions x 10 Marks = 30 Marks (3 Out of 5 - One question from each unit)

### Duration of Examination:

3- Hours examination for courses.

## Grading System

### 1. Grading

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added. The marks thus obtained, will then be graded as per the scheme provided in Table 1.

From the second semester onwards the total performance within a semester and the continuous performance starting from the first semester are indicated by **Semester Grade**

**Point Average (GPA) and Cumulative Grade Point Average (CGPA),** respectively. These two are calculated by the following formulae

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad \text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$$

Where, 'C<sub>i</sub>' is the Credit earned for the Course - i,

'G<sub>i</sub>' is the Grade Point obtained by the student for the Course 'i'.

'M' is the marks obtained for the course 'i', and

'n' is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

### 1. Classification of Final Results

- i) For each of the three parts, there shall be separate classification on the basis of the CGPA, as indicated in the following Table - 2.
- ii) For the purpose of Classification of Final Results, the Candidates who earn CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly, the candidates who earn the CGPA between 8.00 - 8.99, 7.00 - 7.99, 6.00 - 6.99 and 5.00 - 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good' and 'Above Average' respectively.
- iii) Absence from an examination shall not be taken as an attempt.

**Table - I - Grading of the Courses**

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
Below 50	NA	RA

**Table – 2 – Final Result**

CGPA	Classification of Final Results	Corresponding Grade
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
Below 5.00	RA	Re - Appearance

Credit based weighted Mark System is adopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).

#### Declaration of Result:

Mr./Ms. \_\_\_\_\_ has successfully completed the Post Graduate in \_\_\_\_\_ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part - III is \_\_\_\_\_ and the class secured is \_\_\_\_\_ by completing the minimum of 90 credits. The candidate has acquired \_\_\_\_\_ (if any) extra credits offered by the parent department courses.

# GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639 005

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## Course structure under CBCS system

### DEPARTMENT OF COMPUTER SCIENCE

#### PROGRAMME OUTCOMES

1. At the end of the program the students will be able to:
2. **PO1:** Ability to design, implement, and evaluate a computational system to meet Desired needs with in realistic constraints.
3. **PO2:** Ability to function effectively on team to accomplish shared computing design, Evaluation, or implementation goals.
4. **PO3:** An understanding of professional, ethical, legal, security, and social issues and Responsibilities for the computing profession.
5. **PO4:** Ability to analyze impacts of computing on individuals, organizations, and Society.
6. **PO5:** Recognition of the need for and ability to engage in continuing professional Development.
7. **PO6:** Ability to apply design and development principles in the construction of Software systems of varying complexity.

#### PROGRAMME SPECIFIC OUTCOMES

After completion of the Specific Programme, the student will.

- PSO1:** Exhibit proficiency through latest technologies to business and personal situations in demonstrating the ability for work efficacy as a part of team and apply Professional behavior and ethics.
- PSO2:** Pursue higher studies and research by exploring the various motivation factors in the computing discipline associated with the program to function efficiently and Effectively in the modern and challenging society.
- PSO3:** Apply standard Software Engineering practices and strategies in real-time software Project development using open-source programming environment or commercial Environment to deliver quality product for the organization success.
- PSO4:** Design and develop computer programs/computer-based systems in the areas Related to algorithms, networking, web design, Cloud computing, IoT and Data Analytics of varying complexity
- PSO5:** Acquaint with the contemporary trends in industrial/research settings and There by innovate novel solutions to existing problems.



**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR -5**  
 (Re- accredited with 'A' Grade by NAAC and Affiliated to Bharathidasan university, Tiruchirapalli)  
**M.Sc., COMPUTER SCIENCE COURSE STRUCTURE UNDER CBCS SYSTEM**  
 (For the candidates admitted from the year 2021-22 onwards)

SEMESTER	PART	COURSE	COURSE TITLE	COURSE CODE	INSTR.HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
								INT	ESE	
I	III	Core course - I	Advanced Java Programming	P21CS1C1	6	5	3	25	75	100
		Core Course - II	J2EE Programming Lab	P21CS1C2P	6	5	3	40	60	100
		Core Course - III	Data Mining Concept's and Techniques	P21CS1C3	6	5	3	25	75	100
		Core Course - IV	Internet of Things	P21CS1C4	6	5	3	25	75	100
		Elective Course - I	Object Oriented Systems Design	P21CS1E1	6	5	3	25	75	100
					<b>30</b>	<b>25</b>				<b>500</b>
II	III	Core Course - V	Data Science with R	P21CS2C5	6	5	3	25	75	100
		Core Course - VI	R Lab	P21CS2C6P	6	5	3	40	60	100
		Core Course - VII	Advanced Microprocessor & Micro Controllers	P21CS2C7	6	5	3	25	75	100
		Core Course - VIII	Cryptography and Network Security	P21CS2C8	6	5	3	25	75	100
		Elective Course - II	Principles of Compiler Design	P21CS2E2	6	5	3	25	75	100
		Internship Programme				(2)				
					<b>30</b>	<b>25</b>				<b>500</b>
III	III	Core Course - IX	Cloud Computing	P21CS3C9	6	5	3	25	75	100
		Core Course - X	Web Development Lab	P21CS3C10P	6	5	3	40	60	100
		Core Course - XI	Principles of Software Testing	P21CS3C11	6	5	3	25	75	100
		Core Course - XII	Advanced Computer Networks	P21CS3C12	6	5	3	25	75	100
		Elective Course - III	Research Methodology	P21CS3E3	6	5	3	25	75	100
IV	Extra Credit Course	Massive open online Courses (MOOC)	-			(2)				
					<b>30</b>	<b>25</b>				<b>500</b>
IV	III	Core Course - XIII	Open Source Technologies	P21CS4C13	4	3	3	25	75	100
		Core Course - XIV	Open Source Technologies Lab	P21CS4C14P	6	3	3	40	60	100
		Elective Course - IV	Big Data Analytics	P21CS4E4	5	3	3	25	75	100
		Elective Course - V	Soft Computing	P21CS4E5	5	3	3	25	75	100
	IV	Project Work	Project Work	P21CS4PW	10	3	3	**	**	100
					<b>30</b>	<b>15</b>				<b>500</b>
<b>TOTAL</b>					<b>120</b>	<b>90 + (4)</b>				<b>2000</b>

Dissertation – 80 Marks and Viva Voce Examinations – 20 Marks

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**BOARD OF STUDIES IN COMPUTER SCIENCE**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS1C1</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - I SEMESTER - CORE COURSE - I</b> (For the candidates admitted from the year 2021-22 onwards) <b>ADVANCED JAVA PROGRAMMING</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To learn Java basic concepts.</li> <li>2. To know how to use applet programs and its architecture.</li> <li>3. To understand the network basics.</li> <li>4. To identify the server and client side programs.</li> </ol>	
<b>UNIT - I</b>	<b>Introducing Classes and Methods:</b> - Class fundamentals - Declaring Objects - Introducing Methods - Constructors, <b>A Closer Look at Methods and Classes:</b> Overloading Methods - Using Object as Parameters - Returning Objects - <b>Packages and Interfaces:</b> Packages - Importing Packages - Interfaces.
<b>UNIT - II</b>	<b>The Applet Class: Applet Basics</b> - Applet Architecture - An Applet skeleton - The HTML Applet Tag - get Document Base() and get Code Base() - <b>Event Handling:</b> The Delegation Handling Mechanisms - Delegation Event Model - Event Class - Sources of Events - Event Listener Interfaces.
<b>UNIT - III</b>	<b>Introducing the AWT: Working with windows, Graphics and Text:</b> AWT Classes - window fundamentals - working with Frame Windows - Working with Graphics - Working with color and fonts, <b>Using AWT Controls, Layout Managers and Menus:</b> Control Fundamentals - Labels - Buttons - Applying Check Boxes - Using Text Field - Using a Text Area - Check Box Group - Choice Controls - Using Lists - Understanding Layout Managers.
<b>UNIT - IV</b>	<b>Networking:</b> Networking Basics- Java and the Net - Inet Address - TCP/IP Client Sockets - URL - TCP/IP Server Sockets - Data grams,- <b>A Tour of Swing:</b> Applet - Icons and Labels - Text Fields - Buttons - Combo boxes - tabbed Panes – Scroll panes - trees - Tables.
<b>UNIT - V</b>	<b>Servlets:</b> Background - The life cycle of a Servlet - Using Tomcat for servlet Development - A simple Servlet - The Servlet API - The javax.servlet Package - Reading Servlet parameters - Javax.Servlet.HTTP package-Handling HTTP requests and responses - using Cookies - Session Tracking - Security Issues.
<b>TEXT BOOK :</b>	
Herbert Schildt, The Complete Reference Java2, Fifth Edition, Tata Mcgraw Hill.	
<b>REFERENCE BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Patrick Naughton “Complete Reference Java 2” Tata McGraw Hill, 2003.</li> <li>2. Elliotte Rusty Harold “Java Network Programming” ‘O’ Ralley Publications, 2000.</li> <li>3. E.Balagurusamy “Programming with Java” Tata McGraw Hill, 2rd Edition, 2008.</li> </ol>	

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**COURSE OUTCOMES:**

1. To remember the basic concepts of OOPs and HTML tags.
2. To develop the knowledge for Networking and Event handling.
3. To work with Windows, Graphics and Text.
4. To learn AWT controls Layout managers and Menus.
5. To gain the knowledge of Java Beans and Swings.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	4	4	3	3	4	3	4	3	4	3.54
CO2	3	4	3	4	3	3	3	4	3	4	3	3.36
CO3	3	4	3	4	3	4	3	4	3	4	4	3.54
CO4	3	3	4	3	4	3	3	4	3	4	3	3.36
CO5	4	3	4	4	3	2	3	3	4	3	4	3.36
									Mean Overall Score			3.43

**Result: The Score for this course is 3.43(High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: Dr. C. JAYANTHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5**

**COURSE CODE: P21CS1C2P**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**

**M.Sc., COMPUTER SCIENCE - I SEMESTER – CORE COURSE – II**

(For the candidates admitted from the year 2021-22 onwards)

**J2EE PROGRAMMING LAB**

**COURSE OBJECTIVES**

1. To learn how to implement the basic concepts of JAVA.
2. To implement the concept applet and AWT controls.
3. To implement the servlet concept.

**PROGRAMS**

1. Program to implement simple classes and objects, member functions and constructors
2. Program to Implement Method Overloading
3. Program to develop User defined Packages in Java
4. Program to implement Interfaces
5. Program to Implement Applet
6. Write a Java program using AWT Controls
7. Develop a Java Program using Layout Managers
8. Java networking program to implement a simple Server that listens to a client Input
9. Develop a Java Program using Swing
10. Develop a Java Program using Servlet.

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**COURSE OUTCOMES:**

1. To implement classes, functions, constructors and destructors.
2. To develop user defined package and interfaces in java.
3. To know, how to connect a database using JDBC connections.
4. To learn how to transfer files from server to client.
5. To develop a java program using Swing and Java beans.

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	3	3	4	4	3	3	3.36
CO2	3	4	3	4	3	4	3	4	3	4	3	3.45
CO3	3	3	3	4	3	4	3	3	3	4	4	3.36
CO4	4	3	4	3	4	3	3	4	3	4	3	3.45
CO5	4	3	4	4	3	4	4	3	4	3	4	3.63
									Mean Overall Score			3.45

**Result: The Score for this course is 3.45 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. C. JAYANTHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS1C3</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - I SEMESTER – CORE COURSE – III</b> (For the candidates admitted from the year 2021-22 onwards) <b>DATA MINING CONCEPTS AND TECHNIQUES</b>	
<b>COURSE OBJECTIVES</b>	
1. To know the basics of data mining. 2. To learn the pre processing methods. 3. To understand the OLAP technology and cluster methods and web mining.	
<b>UNIT - I</b>	Introduction:- Data mining- definition, importance, motivation , kinds of data; data mining functionalities; Classification of data mining systems, data mining task primitives, Integration of a Data Mining System with a Database or Data Warehouse System , Major Issues in Data Mining.
<b>UNIT - II</b>	Data Pre-processing:- Descriptive Data summarization, Data cleaning, Data Integration and transformation, Data Reduction, Data Discretization and concept Hierarchy Generation - Mining Frequent Patterns, Associations, and Correlations:- Basic Concepts- Efficient and Scalable Frequent Item set Mining Methods - Mining Various Kinds of Association Rules - From Association Mining to Correlation Analysis - Constraint Based Association Mining.
<b>UNIT - III</b>	Data Warehouse and OLAP Technology:- Definition-Data Warehouse Architecture-From Data Warehouse to Data Mining Classification and Prediction:- Definition, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Other Classification Methods: - Genetic Algorithms, Rough Set Approach, Fuzzy Set Approaches. Prediction: - Linear Regression, Nonlinear Regression, Other regression Based methods.
<b>UNIT - IV</b>	Cluster Analysis: - Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Grid-Based Methods, Model-Based Clustering Methods. Graph Mining- Social Network Analysis - Multi relational Data Mining.
<b>UNIT - V</b>	Web Mining: - Web Mining Definition - Web Content Mining - Web Structure Mining- Web Usage Mining - Text Mining - Unstructured Text- Episode Rule Discovery for Texts - Hierarchy of Categories - Text Clustering.
<b>TEXT BOOKS :</b>	
1. Jiawei Han, Micheline Kamber, and Jian Pei, Data Mining: Concepts and Techniques, 3rd ed., Morgan Kaufmann, 2011 2. Arun K.Pujari, “Data Mining Techniques”, Universities Press (India) Private Limited, First Edition 2001.	
<b>REFERENCE BOOK:</b>	
GK Gupta, Introduction to Data Mining with case studies by PHI pvt. Ltd., Third printing 2009.	

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**COURSE OUTCOMES:**

1. To students can be well versed in all data mining algorithms, methods of evaluation.
2. To impart the knowledge to students to accumulate the data from large dataset and analyze for an specific application.
3. To make the students to cope up with the emerging technologies using data mining.
4. To analyze the problem domain, use the data collected in enterprise apply the appropriate data mining technique, interpret and visualize the results.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	4	3	3	4	4	3	3	3.45
CO2	3	4	4	4	3	4	3	3	4	3	4	3.54
CO3	3	4	3	4	3	4	3	4	3	4	4	3.54
CO4	3	3	4	3	4	3	3	4	3	4	3	3.36
CO5	4	3	4	3	4	3	3	4	4	3	3	3.45
									Mean Overall Score			3.47

**Result: The Score for this course is 3.47(High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: R. MANIVASAGAN**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>		<b>COURSE CODE: P21CS1C4</b>	
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - I SEMESTER – CORE COURSE – IV</b> (For the candidates admitted from the year 2021-22 onwards) <b>INTERNET OF THINGS</b>			
<b>COURSE OBJECTIVES</b>			
<ol style="list-style-type: none"> <li>1. To understand the technology behind Internet of Things</li> <li>2. To comprehend the architecture, design principles and standards of IoT.</li> <li>3. To know about business models and ethics in Internet of Things</li> <li>4. To obtain an overview of Iota applications.</li> <li>5. To knowing about Python language.</li> </ol>			
<b>UNIT - I</b>	Introduction to Internet of Things, Physical design of IoT, Logical Design of IoT, IoT enabling Technologies. - Domain Specifics of IoT, home automation, cities, Environment, Energy, Retails, Logistics, Agriculture, Industry, Health and Life style.		
<b>UNIT - II</b>	IoT and M2M - Difference between IoT and M2M, SDN and NFV for IOT. IOT System management with NETCONF-YANG-Need for IOT system management, SNMP, Network operator environment, NETCONF, YANG.		
<b>UNIT - III</b>	IOT Platforms design methodology, Introduction, IOT Design methodology, Case study on IoT System on weather monitoring. IoT Systems logical design using Python, Introduction, Installing python, Python data types and data structures, Control flow. Functions, Modules.		
<b>UNIT - IV</b>	Packages, File handling, Date time operations, classes, Python packages of interest for IoT. IoT physical devices and end points, what is an IoT Device, Exemplary device: Raspberry PI, about the board, Linux on Raspberry PI, Raspberry PI interfaces, Other IoT devices.		
<b>UNIT - V</b>	Data analytics for IoT-Introduction, Apache Hadoop, and Using Hadoop map reduce for batch data analysis. Case studies - Illustrating IoT design-Introduction, Home automation, cities, environment, agriculture.		
<b>TEXT BOOKS :</b>			
<ol style="list-style-type: none"> <li>1. Arsdeep Bahga &amp; Vijay Mandisetti, Internet of Things - A Hands on Approach, 2014.</li> <li>2. Disrupt, Maciej Kranz, Building the Internet of Things: Implement New Business Models, Willey Publications, 2016.</li> <li>3. Adrian McEwen, Hakim Cassimally, Designing the Internet of Things by Willey Publications 2015.</li> </ol>			
<b>REFERENCE BOOK:</b>			
Internet of Things: Principles and Paradigms by Raj kumar Buyya, Amir Vahid Dastjerdi morgan Kaufmann 2014.			

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

1. [www.tutorialspoint.com](http://www.tutorialspoint.com)
2. <http://internetofthingsagenda.techtarget.com>
3. <http://www.businessinsider.com/what-is-the-internet-of-things>

**COURSE OUTCOMES:**

1. To know about the evolution for mobile, home and embedded applications that is connected to the internet, to integrate communication.
2. To analyze basic protocols in wireless sensor network.
3. To get familiar about python data types.
4. To know how the industries are adopting internet-of-things-solutions to improve their existing systems.
5. To design and program IoT devices.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	4	3	3	2	3	2	4	3	3	3.3
CO2	3	2	2	3	3	2	3	3	4	3	3	3.1
CO3	3	3	3	2	3	3	3	4	3	3	3	3.3
CO4	3	3	3	2	4	3	3	3	3	3	3	3.3
CO5	3	3	2	4	3	2	4	3	2	3	2	3.1
									Mean Overall Score			3.22

**Result: The Score for this course is 3.22 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: A. SARASWATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS1E1</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - I SEMESTER – ELECTIVE COURSE – I</b> (For the candidates admitted from the year 2021-22 onwards) <b>OBJECT ORIENTED SYSTEMS DESIGN</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To understanding the insight and knowledge into analyzing and designing software using different object-oriented modeling techniques.</li> <li>2. To specify, analyze and design the use case driven requirements for a particular system.</li> <li>3. To explore and analyze different analysis and design models.</li> <li>4. Ability to deliver robust software components.</li> </ol>	
<b>UNIT - I</b>	<b>OBJECT BASIS:</b> Object Oriented Philosophy - Object - Object State, behaviors and methods. Encapsulation and information hiding Class hierarchy -polymorphism, Object relationships and association - aggregation, object containment - Meta classes - Object Oriented System Development Life Cycle.
<b>UNIT - II</b>	<b>OBJECT ORIENTED METHODOLOGIES:</b> Introduction - Rumbaugh et al.'s Object Modelling - Booch Methodology - Jacobson et al. Methodology - Unified approach - Unified Modelling Language - Introduction - UML diagrams - UML class diagrams – Use case diagrams - UML dynamic modelling.
<b>UNIT - III</b>	<b>OBJECT ORIENTED ANALYSIS:</b> Business Object Analysis - Use case driven approach - Use case model - Developing effective communication. Object analysis - Approaches for identifying classes - Noun phrase approach - Common class patterns approach - Classes, Responsibilities and Collaborators <b>IDENTIFYING OBJECT RELATIONSHIPS AND METHODS:</b> Introduction - Associations, Super - sub class relationship, A - part - of relationship - Aggregation - case study.
<b>UNIT - IV</b>	<b>OBJECT ORIENTED DESIGN:</b> Object Oriented design process - Design axioms - corollaries - design patterns - designing classes - Design philosophy - The Process - class visibility - Refining attributes - Designing methods and protocols.
<b>UNIT - V</b>	<b>SOFTWARE QUALITY ASSURANCE:</b> Introduction Quality assurance tests -Testing strategies - Test cases - Test plan - continuous testing. <b>SYSTEM USABILITY AND MEASURING USER SATISFACTION:</b> - Introduction - usability testing - User satisfaction test - case study.
<b>TEXT BOOK :</b>	
Ali Bahrami, "Object Oriented Systems Development" Irwin-McGraw Hill, New Delhi, International editions.	
<b>REFERENCE BOOK:</b>	
Grady Booch, "Object Oriented Analysis and Design with applications", II Edition, Addition Wesley.	



**COURSE OUTCOMES:**

**CO1:** To introduce the basic concepts of Object Oriented Programming with system development life Cycle.

**CO2:** To understand the familiar Object Oriented Methodologies and UML diagrams.

**CO3:** To analyze the Objects, its relationships and methods.

**CO4:** To gain the knowledge about Object Oriented Design process.

**CO5:** To acquire Knowledge in Software Quality Assurance and measuring user satisfaction.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	3	4	4	3	2	4	3	3	3	3	3.18
CO2	4	3	3	2	3	2	3	3	4	3	2	3.36
CO3	3	3	3	4	3	2	3	4	3	4	3	3.18
CO4	4	2	3	3	4	2	3	4	3	3	3	3.09
CO5	3	3	2	4	3	3	4	2	4	2	2	2.90
									Mean Overall Score			3.14

**Result: The Score for this course is 3.14 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: A. SARASWATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5****COURSECODE: P21CS2C5**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - II SEMESTER – CORE COURSE – V**  
 (For the candidates admitted from the year 2021-22 onwards)

**DATA SCIENCE WITH R**

**COURSE OBJECTIVES**

1. To learn about the fundamental science of data and concepts of big data.
2. To comprehend the lifecycle of the data analytics and data analytics using R.
3. To discover the advanced data analytics methods and big data analytics.

<b>UNIT - I</b>	Introduction to Big Data Science - Definition of Big Data - Big data characteristics & considerations - Data repositories - analyst perspective - Business drivers for analytics - Typical analytical architecture - Business Intelligence Vs Data science - Drivers of Big data analytics - Role of data scientist in Big data ecosystem - Applications of Big data analytics.
<b>UNIT - II</b>	Data Analytics Lifecycle -Need of Data analytic lifecycle - Key roles for successful analytic projects - various phases of Data analytic lifecycle: Discovery - Data Preparation - Model Planning - Model Building - Communicating Results - Operationalization.
<b>UNIT - III</b>	Basic Data Analytics methods using R: Introduction to R: GUI of R - Getting data into & out of R - Data types in R - Basic operations - Basic statistics - Generic functions - Data visualization using R - Data exploration & presentation - Statistics for model building & evaluation.
<b>UNIT - IV</b>	Advanced Analytics - Theory & Methods: Clustering - Association Rules - Apriori algorithm - Linear Regression - Logistics Regression - Naïve Bayesian classifiers - Decision Trees.
<b>UNIT - V</b>	Advanced Analytics - Big Data: Time series analysis - Text analysis -Technology and Tools: Map Reduce and Hadoop - Communicating and Operationalizing an Analytics Project - Creating the Final Deliverables.

**TEXT BOOKS :**

1. David Dietrich - Barry Hiller - “Data Science & Big Data Analytics” - EMC education services - Wiley publications - 2012.
2. Trevor Hastie - Robert Tibshirani - Jerome Friedman - "The Elements of Statistical Learning" - Springer - Second Edition - 2011.

**REFERENCE BOOKS:**

1. Mark gardner - “Beginning R: The Statistical Programming Language” - Wrox Publication.
2. Adam Fowler - “No SQL For Dummies” - John Wiley & Sons - ISBN1118905628.

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

1. [www.tutorialspoint.com](http://www.tutorialspoint.com)
2. <https://www.stat.pitt.edu/sungkyu/course/pds/material/Lec2.pdf>
3. <https://www.amazon.ca/Getting-Started-Data-Science-Analytics>.

**COURSE OUITCOMES:**

1. To demonstrate proficiency with statistical **analysis** of **data**.
2. To develop the ability to build and assess **data**-based models.
3. To execute statistical analyses with professional statistical software.
4. To demonstrate skill in **data** management
5. To execute statistical analyses with professional statistical software.

**Nature of Course**

Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	4	3	2	2	3	2	4	2	3	3.0
CO2	3	2	3	3	4	2	3	3	3	2	3	3.0
CO3	3	3	3	2	4	3	2	4	3	3	3	3.3
CO4	2	3	3	2	4	3	2	3	3	4	2	3.1
CO5	3	3	2	4	2	3	4	3	2	3	2	3.1
									Mean Overall Score			3.1

**Result: The Score for this course is 3.1 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: A. SARASWATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5**

**COURSE CODE: P21CS2C6P**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - II SEMESTER – CORE COURSE – VI**  
(For the candidates admitted from the year 2021-22 onwards)

**R LAB**

**COURSE OBJECTIVES**

1. To implement mathematical aggregation operators in “R-script”.
2. To understand the Statistical operations in “R”.

**PROGRAMS**

1. To get the input from user and perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND) using in R.
2. To perform data import/export (.CSV, .XLS, .TXT) operations using data frames in R.
3. To get the input matrix from user and perform Matrix addition, subtraction, multiplication, inverse transpose and division operations using vector concept in R.
4. To perform statistical operations (Mean, Median, Mode and Standard deviation) using R.
5. To perform data pre-processing operations i) Handling Missing data ii) Min Max normalization
6. To perform dimensionality reduction operation using PCA for Houses Data Set.
7. To perform Simple Linear Regression with R.
8. To perform K-Means clustering operation and visualize for iris data set.
9. Write R script to diagnose any disease using KNN classification and plot the results.

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**COURSE OUTCOMES:**

1. To apply practical knowledge of mathematical aggregation operators in “R-script”.
2. To identify the various functional operations in R.

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	4	3	3	2	3	2	3	3	3	3.1
CO2	3	2	3	3	3	2	3	4	3	4	3	3.3
									Mean Overall Score			3.2

**Result: The Score for this course is 3.2 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: A. SARASWATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5****COURSE CODE: P21CS2C7**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - II SEMESTER - CORE COURSE – VII**  
 (For the candidates admitted from the year 2021-22 onwards)

**ADVANCED MICROPROCESSORS AND MICROCONTROLLERS**

**COURSE OBJECTIVES**

1. To know the processor architecture.
2. To learn the instruction set and memory management functions.
3. To understand the registers and microcontroller signal processing.

<b>UNIT - I</b>	The Processors:8086/8088: Register Organisation of 8086 - Architecture - Signal Descriptions of 8086 - Physical Memory Organisation - General Bus Operation - I/O Addressing Capability - Special Processor Activities - Minimum Mode 8086 System and Timings - Maximum Mode 8086 System and Timings.
<b>UNIT - II</b>	8086/8088 Instruction Set and Assembler Directives: Machine Language Instruction Formats - Addressing Modes of 8086 - Instruction set of 8086/8088. Assembly Language Programs: Addition of two numbers - Addition of a Series of 8-Bit numbers - Find out the Largest number - Find the Even and Odd numbers - Move a String of Data Words.
<b>UNIT - III</b>	80286-80287 - A Microprocessor with Memory Management and Protection: Salient Features of 80286 - Internal Architecture of 80286 – Signal Descriptions of 80286 - Real Addressing Mode - Protected Virtual Address Mode (PVAM)
<b>UNIT - IV</b>	80386-80387 and 80486 - The 32 Bit Processors: Salient Features of 80386DX - Architecture and Signal Descriptions of 80386 - Register Organisation of 80386 - Addressing Modes - Data Types of 80386 - Real Addressing Mode of 80386 - Protected Mode of 80386 - Segmentation - Paging.
<b>UNIT - V</b>	An Introduction to Microcontrollers 8051 and 80196: Intel’s Family of 8 - bit Microcontrollers - Architecture of 8051 - Signal Descriptions of 8051 - Register Set of 8051 - Instruction Set of 8051.

**TEXT BOOK :**

A.K. Ray and K.M. Bhurchandi, “Advanced Microprocessors and Peripherals” by Tata McGraw Hill, New Delhi 2002.

**REFERENCE BOOK:**

A. Nagoor Kani, “Microprocessor and Microcontrollers”, 2nd Edition, McGraw Hill Publication.

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**COURSE OUTCOMES:**

1. To create less expensive and less complex circuitry.
2. To it allows electronic automation in situations where a full-sized computer is not needed.
3. To crate automatically managed inventions and appliances.
4. Ability to execute big and generic applications.

<b>Nature of Course</b>			
Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	4	3	4	4	3	3	3.45
CO2	3	4	3	4	3	3	4	3	4	3	4	3.45
CO3	3	3	3	4	3	4	3	4	3	4	3	3.36
CO4	3	3	4	3	4	3	3	4	3	4	3	3.36
									Mean Overall Score			3.41

**Result: The Score for this course is 3. 41 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: Dr. A. VINAYAGAM**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS2C8</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - II SEMESTER – CORE COURSE – VIII</b> (For the candidates admitted from the year 2021-22 onwards) <b>CRYPTOGRAPHY AND NETWORK SECURITY</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To analyze the security attacks in network.</li> <li>2. To learn symmetric and asymmetric key cryptography methods.</li> <li>3. To understand the system security and firewall concept.</li> </ol>	
<b>UNIT - I</b>	<b>Introduction:</b> Security Goals - Cryptographic Attack - Service and Mechanism - Techniques - <b>Traditional Symmetric-Key Ciphers:</b> Introduction - Substitution Ciphers - Transposition Ciphers - Keyless Transposition Ciphers - Keyed Transposition Ciphers - Combining Two Approaches.
<b>UNIT - II</b>	<b>Introduction to Modern Symmetric Key Ciphers:</b> Modern Block Ciphers - Substitution or Transposition - Block Ciphers as Permutation Groups - Components of a Modern Block Cipher - S-Boxes - Product Ciphers - Two Classes of Product Ciphers.
<b>UNIT - III</b>	<b>Data Encryption Standard (DES):</b> Introduction - DES Structure - Initial and Final Permutations - Rounds - DES Function - S-Boxes - Cipher and Reverse Cipher - Key Generation - DES Analysis - Security of DES.
<b>UNIT - IV</b>	<b>Asymmetric-Key Cryptography:</b> Introduction - RSA Cryptosystem - Rabin Cryptosystem - ElGamal Cryptosystem - Elliptic Curve Cryptosystems
<b>UNIT - V</b>	<b>System Security:</b> Description of the System - Users, Trust and Trusted Systems - Malicious Programs - Worms - Viruses - Intrusion Detection Systems(IDS) - Firewalls: Definitions, Construction and Working Principles.
<b>TEXT BOOK :</b>	
“Cryptography and Network Security “ by Behrouz A.Forouzan, Debdeep Mukhopadhyay, 2nd Edition, McGraw-Hill Companies, Inc., New York,2010.	
<b>REFERENCE BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. William Stallings, “Cryptography and Network Security, Principles and Practice”. PHI, Third edition 2003.</li> <li>2. Johannes A. Buchnan, “Introduction to Cryptography”. Springer - Verlag Atul Kahate, “Cryptography and Network Security”,</li> </ol>	

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**COURSE OUTCOMES:**

1. To learn the basics of security goals and cryptographic attack.
2. To understand the concepts of Mathematics of cryptography.
3. To know the knowledge of traditional symmetric-key.
4. To understand the concepts of Advanced Encryption Standard (AES) and Data Encryption Standard (DES).
5. To learn the concepts of RSA Cryptosystem and Security of application layer.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	4	3	3	4	3	4	3	3.45
CO2	3	4	3	4	3	4	3	4	3	4	3	3.45
CO3	3	4	3	4	3	4	3	4	3	3	3	3.36
CO4	3	3	4	3	4	3	4	3	4	3	4	3.18
CO5	3	3	4	4	3	4	3	4	3	3	4	3.45
									Mean Overall Score			3.37

**Result: The Score for this course is 3.37 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: Dr. C. JAYANTHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS2E2</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - II SEMESTER ELECTIVE COURSE - II</b> (For the candidates admitted from the year 2021-22 onwards) <b>PRINCIPLES OF COMPLIER DESIGN</b>	
<b>COURSE OBJECTIVES</b>	
1. To know the basic concept of compilers. 2. To learn the working function of compilers. 3. To understand the compiler generation tools and techniques.	
<b>UNIT I</b>	Introduction to compiler : compilers and translators - structure of a compiler - Finite state automation and lexical analysis - the role of the lexical analyzer - A simple approach to the design of lexical analyzer - regular expressions - Finite automata (NFA , DFA ) - regular expression to finite automata - minimizing the number of states of DFA - a language for specifying lexical analyzers - implementation of lexical analyzer.
<b>UNIT II</b>	Context free grammars - Deviation and parse trees - Parser - Shift - reduce parsing - Operator - precedence parsing - Top - Down - parsing - Predictive parsers.
<b>UNIT III</b>	Syntax directed translation: syntax directed translation scheme - Implementation of syntax - Directed Translators - Intermediate Code - postfix notation - parse trees and syntax - Three - address codes, Quadruples and triples - Translation of assignment statements.
<b>UNIT IV</b>	Symbol tables: contents of symbol table - Data structure for symbol tables - Run time storage administration: Implementation of a simple stack allocation Scheme - Implementation of block structured languages - error detection and recovery: Errors - Lexical phase error - syntactic phase error- semantic errors.
<b>UNIT V</b>	Code optimization: principle sources of optimization - Loop Optimization - DAG representation of basic blocks - Value numbers and algebraic laws - code generation: Object Programs - problems in code generation - A machine model- A simple code Generation.
<b>TEXT BOOK</b>	
Alferd V. Aho, Jeffery D. Ullman, “Principles of Compiler Design” Pearson Education, New Delhi 2002. (chapters 1,3-57,9-12,15)	
<b>REFERENCES BOOKS</b>	
1. William A. Barrett, Rodney M. Bates, David A.Gustafson and John D. Couch -“Compiler Construction Theory and Practice”, Galgotia Publication Co., 1990. 2. Jean - Paul Trembley and Paul G. Soreson - “Thee theory and Practice of Complier Writing” McGraw Hill 1985.	

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**COURSE OUTCOMES:**

1. To learn working of compiler and non-compiler applications.
2. To state and scrutinizing the lexical, syntactic and semantic structures of advanced language features.
3. To understanding the techniques of Diminishing the memory using code optimization.
4. To know about compiler generation tools and techniques.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	4	3	4	4	3	4	3.54
CO2	3	4	3	4	3	3	3	3	3	4	3	3.27
CO3	3	3	3	4	3	4	3	4	3	4	4	3.45
CO4	3	4	4	3	4	3	3	4	3	3	4	3.45
									Mean Overall Score			3.43

**Result: The Score for this course is 3.43 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: R. MANIVASAGAN**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS3C9</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - III SEMESTER CORE COURSE - IX</b> (For the candidates admitted from the year 2021-22 onwards) <b>CLOUD COMPUTING</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To learn about cloud environment.</li> <li>2. To understand the challenges and ethical issues in cloud computing.</li> <li>3. To know the cloud services and resource sharing.</li> </ol>	
<b>UNIT - I</b>	Introduction-What is the Buzz About-Limitations of the Traditional Computing Approaches - Three layers of Computing - Three layers in Traditional Computing-The End of Traditional Computing- Influences behind Cloud service adoption-Evolution and Enabling Technologies -The Evolution of Cloud Computing-How Philosophies converged into Cloud Computing - comparison between Cluster, Grid and Cloud Computing.
<b>UNIT - II</b>	Benefits and Challenges- Origin of the term Cloud Computing- Early initiatives-Utility computing-Metering and billing in Cloud- Separation of Data Centre Operations-Benefits of Cloud Computing-Challenges of Cloud Computing - Ethical issues in Cloud Computing- Cloud Computing: Network as Computer-Role of web service - Role of API- Cloud Computing Model - Standard Cloud Model - Cloud Deployment Models - Choosing the appropriate deployment model.
<b>UNIT - III</b>	Cloud Computing Services-Service Delivery Models SPI Model -A traditional system Vs Cloud System Model-All applications delivered using web services are not SaaS- Other category of Cloud Services-Open Cloud Services-Security reference Model-The security concern in Cloud - Cloud Security working groups-Elements of Cloud Security Model-Cloud Security Reference Model-Examining Cloud Security against traditional Computing.
<b>UNIT - IV</b>	Resource pooling, sharing and Provisioning- Resource Pooling- Commoditization of the data centre-Standardization, automation and Optimization- Resource sharing- Resource Provisioning- Scaling in the cloud- What is Scaling- Scaling in traditional computing- Scaling in Cloud Computing-Foundation of Cloud Scaling-Scalable application-Scaling strategies in Cloud-Auto scaling in Cloud- Types of Scaling- Horizontal Scaling is more Cloud-Native approach- The resource contention problem- Cloud bursting: A Scenario of flexible scaling.
<b>UNIT - V</b>	File System and Storage-Requirements of Data-intensive Computing-Challenges before Cloud native File system-Model for high-performance processing of large data-sets-Cloud native file system - Storage types-Popular cloud storage for developers-Popular general purpose cloud storage-Database technology-Database and Clouds- data models - Relational DBMS in Cloud - Non Relational DBMS in Cloud-Security issues-Cloud Security-Threats to Cloud Security-Infrastructure Security-Information Security.
<b>TEXT BOOK:</b>	
Sandeep Bhowmik, Cloud Computing by Cambridge university press.	
<b>REFERENCES BOOKS:</b>	
<ol style="list-style-type: none"> <li>1. Michael Miller,Cloud Computing by Pearson Education.</li> <li>2. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi by Mastering cloud computing.</li> </ol>	

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

**COURSE OUTCOMES**

1. To analyze the cloud environment.
2. To identify the benefits and challenges in cloud.
3. To justify the services provided by the cloud.
4. Able to know the concept of resource sharing and provisioning.
5. To know the security issues in cloud.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	3	3	4	4	3	3	3.36
CO2	3	4	3	4	3	3	3	3	3	3	3	3.18
CO3	3	3	3	4	3	4	3	3	3	4	4	3.36
CO4	3	3	4	3	4	3	3	3	3	3	3	3.18
CO5	3	3	4	4	3	3	3	3	4	3	3	3.27
									Mean Overall Score			3.27

**Result: The Score for this course is 3.27 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: Dr. A. BANUMATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5**

**COURSE CODE: P21CS3C10P**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - III SEMESTER CORE COURSE - X**  
(For the candidates admitted from the year 2021-22 onwards)

**WEB DEVELOPMENT LAB**

**COURSE OBJECTIVES**

1. To learn the web based application development.
2. To know the different platforms and its working functions.
3. To understand how to design and implement web based application.

1. Develop a package for demonstrating an application using java with JDBC connectivity.
2. Develop a package for our department student profile maintenance system.
3. Develop a web site for e-commerce applications such as flipkart, snapdeal, shopclues
4. Develop web pages for displaying current events and schedules for department activities.
5. Develop web pages for performing network services (Airtel, Aircel and voda phone).
6. Develop the digital library for our department.

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

**COURSE OUTCOMES**

1. To learn how to design web services for different domains.
2. To prepare document based on the web application development.
3. To be familiar with web development platform.

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	4	3	4	3	4	3	4	3	3.45
CO2	4	3	4	3	4	4	3	4	3	4	3	3.45
CO3	3	4	3	4	3	4	3	4	3	3	3	3.36
									Mean Overall Score			3.42

**Result: The Score for this course is 3.42 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. A. BANUMATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 5**

**COURSE CODE: P21CS3C11**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - III SEMESTER CORE COURSE - XI**  
(For the candidates admitted from the year 2021-22 onwards)

**PRINCIPLES OF SOFTWARE TESTING**

**COURSE OBJECTIVES**

1. To interpretation of fundamental concepts in software testing.
2. To discuss various types of software testing, its issues and solutions.
3. To expose the advanced software testing.

**UNIT I**

Software Development Life Cycle Models: Phases of software project - Quality, Quality Assurance, and Quality Control - Testing, verification, and validation - Process model to represent different phases - Lifecycle models. Type soft testing: White box testing: What is white box testing? - Static Testing - Structural testing - Challenges in white box testing.

**UNIT II**

Black box testing: What is Black box testing? - Why is Black box testing?-When to do Black box testing? - How to do Black box testing? - Integration testing: What is integration testing? - Integration testing as a type of testing-Integration testing asa phase of testing - scenario testing defect bash.

**UNIT III**

System and Acceptance testing: System testing overview - Why is system testing done? Functional versus on functional testing - Functional system testing - Non - functional testing Acceptance testing Performance testing: Introduction-Factors governing performance testing - Methodology for performance testing-Tools for performance testing-Process for performance testing.

**UNIT IV**

Regression testing: What is Regression testing? - Types of regression testing - When to do regression testing?-How to do regression testing?-Best practices in Regression testing. Ad Hoc testing: Overview of Adhoc testing-Buddy testing-Pair testing - Exploratory testing Iterative testing-Agile and extreme testing-Defect seeding

**UNIT V**

Testing of object oriented systems: Introduction - Primer on object oriented software - Differences in OO testing. Usability and accessibility testing: What is usability testing? - Approach to usability-When to dous ability testing?-How to achieve usability? - Quality factors for usability-Aesthetics testing- accessibility testing - Tools forus ability - Usability lab setup-Test roles for us ability.

**TEXT BOOK**

Srinivasan Desikan, Gopaldaswamy Ramesh, “Software testing” Principles and Practices, Pearson Education, New Delhi, 2006.

**REFERENCES BOOK**

1. Introducing Software Testing -Louis Tares, Addison Wesley Publication, First Edition.  
Software Testing, Ron Patton, SAMS Tech Media, Indian Edition 2001 Software Quality Producing practical, Consistent software - Mordechai Ben - Menachem, Gary S. Marliss, Thomson Learning,2003.



**COURSE OUTCOMES**

1. To design test cases suitable for a software development for different domains.
2. To identify suitable tests to be carried out.
3. To prepare test planning based on the document.
4. To document test plans and test cases designed.
5. To use of automatic testing tools.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	2	3	4	4	3	3	3.27
CO2	3	4	2	4	3	3	3	3	3	3	3	3.09
CO3	3	3	3	4	3	4	3	3	3	4	4	3.36
CO4	3	2	4	3	4	3	3	2	3	3	3	3.00
CO5	3	3	4	4	3	2	3	3	4	3	3	3.18
									Mean Overall Score			3.18

**Result: The Score for this course is 3.18 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. A. VINAYAGAM**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>		<b>COURSE CODE: P21CS3C12</b>	
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005.</b> <b>M.Sc., COMPUTER SCIENCE - III SEMESTER CORE COURSE - XII</b> (For the candidates admitted from the year 2021-22 onwards) <b>ADVANCED COMPUTER NETWORKS</b>			
<b>COURSE OBJECTIVES</b>			
<ol style="list-style-type: none"> <li>1. To study communication network protocols, different communication layer structure.</li> <li>2. To learn security mechanism for data communication.</li> </ol>			
<b>UNIT I</b>	Introduction - Network Hardware - Software - Reference Models - OSI and TCP/IP models - Example networks: Internet, 3G Mobile phone networks, Wireless LANs - RFID and sensor networks - Physical layer - Theoretical basis for data communication - guided transmission media.		
<b>UNIT II</b>	Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure - local loop, trunks and multiplexing, switching. Data link layer: Design issues - error detection and correction.		
<b>UNIT III</b>	Elementary data link protocols - sliding window protocols - Example Data Link protocols - Packet over SONET, ADSL - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols.		
<b>UNIT IV</b>	Network layer - design issues - Routing algorithms - Congestion control algorithms - Quality of Service - Network layer of Internet - IP protocol - IP Address - Internet Control Protocol.		
<b>UNIT V</b>	Transport layer - transport service - Elements of transport protocol - Addressing, Establishing & Releasing a connection - Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol - TCP - Network Security: Cryptography.		
<b>TEXT BOOK</b>			
<ol style="list-style-type: none"> <li>1. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.</li> </ol>			
<b>REFERENCES BOOKS</b>			
<ol style="list-style-type: none"> <li>1. B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.</li> <li>2. F. Halsall, 1995, Data Communications, Computer Networks and Tamil Nadu State Council for Higher Education 35 Open Systems, Addison Wessley.</li> <li>3. D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.</li> <li>4. Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.</li> <li>5. Teresa C. Piliouras, “Network Design Management and Technical Perspectives, Second Edition”, Auerbach Publishers, 2015.</li> </ol>			

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

**COURSE OUTCOMES**

1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. To be familiar with wireless networking concepts, and be familiar with contemporary issues in networking technologies.
4. To be familiar with network tools and network programming.

<b>Nature of Course</b>			
Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	4	3	4	4	3	4	3.54
CO2	3	4	3	4	3	4	3	4	3	4	3	3.45
CO3	3	4	3	4	3	4	3	4	3	4	4	3.54
CO4	4	3	4	3	4	3	4	3	3	4	3	3.45
									Mean Overall Score			3.5

**Result: The Score for this course is 3.5 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. K. NACHIMUTHU**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 5</b>	<b>COURSE CODE: P21CS3E3</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - III SEMESTER - ELECTIVE COURSE - III</b> (For the candidates admitted from the year 2021-22 onwards) <b>RESEARCH METHODOLOGY</b>	
<b>COURSE OBJECTIVES</b>	
1. To familiarize participants with basic of <b>research</b> and the <b>research</b> process. 2. To enable the participants in conducting <b>research</b> work and formulating, <b>research</b> synopsis and report. 3. To develop understanding on various kinds of research, objectives of doing research, <b>research</b> process, <b>research</b> designs and sampling.	
<b>UNIT - I</b>	Research Methodology: An Introduction : Meaning of Research - Objectives of Research – Motivation in Research - Types of Research - Research Approaches - Significance of Research - Research Methods versus Methodology - Research and Scientific Method - Importance of knowing How Research is Done - Research Process - Criteria of Good Research - Problems Encountered by Researchers in India. Defining the Research Problem: What is Research Problem? - Selecting the Problem - Necessity of Defining the Problem - Technique involved in Defining a Problem - An Illustration - Conclusion. Methods of Data Collection: Collection of Primary Data - Observation Method - Interview Method - Collection of Data through questionnaires - Collection of Data through Schedules - Difference between Questionnaires and Schedules - Some other Method s of Data Collection - Collection of Secondary Data - Selection of Appropriate Method for Data Collection - Case Study Method.
<b>UNIT - II</b>	Sampling Design: Implications, Steps Criteria for Sampling Procedure, Characteristics of Good Sample Design, Different Types of Sample Design, Different Types of Sample Design-(a) Probability Sampling Like Simple Random, System Random, Systematic Random, Stratified, Cluster.(B) Non Probability Sampling Like Quota, Judgmental, Convenience Report Writing and Interpretation- Pre-Writing Considerations. Meaning and Technique of Interpretation, Different Types of Report Writing, formats of Report Writing, Thesis Writing, formats of Publication in Research Journals.
<b>UNIT - III</b>	Processing and Analysis of Data: Processing Operations - Some Problem in Processing - Elements / Types of Analysis - Statistics in Research - Measures of Central Tendency - Measures of Dispersion - Measures of Asymmetry - Measures of Relationship - Simple Regression Analysis - Multiple Correlation and Regression - Partial Correlation - Association in Case of Attributes - Other Measures.
<b>UNIT - IV</b>	Large Sample Test: Definition of Hypothesis, Basic Concepts- Null Hypothesis and Alternative, The Level of Significance, Type I and Type II Errors, Two Tailed and One Tailed, Power of Test, Testing of Mean, Testing of Differences Between Two Means, Testing of Proportion of Difference Between Two Proportion Limitations of Hypothesis Testing. Small Sample Test: Idea of Degree of Freedom, Test Significance Based Upon T and F Statistic-Testing of Mean, Testing of Difference Between Two Means, Testing of Equality of Variances, Chi-Square Test.
<b>UNIT - V</b>	Virtualization: Introduction, Characteristics, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Example.
<b>TEXT BOOKS</b>	
1. Kothari C.R., “Research Methodology - Methods and Techniques”, Second Revised Edition, New Age International Publishers Ltd., New Delhi, 2005. 2. Rajkumar Buyya, Christian Vecehiola and S. Thamarai Selvi, “Mastering Cloud Computing”, MGH New Delhi, 2013.	
<b>REFERENCES BOOKS</b>	
1. Mohamed Kantardzic, “Data mining concepts, models, methods, and algorithms”, Siley Inter science, 2003 2. Micahel Miller, “Cloud Computing”, Pearson Education, 2012. 3. Berkb Eurht and Armando J. Escalante, “Handbook of Cloud Computing”, Springer 2010.	

**COURSE OUTCOMES**

1. To inculcate in the research knowledge in the student mind.
2. To identify the appropriate parameters for a particular application.
3. To a system of methods used to help students in a particular area of study or activity.
4. To develop the skills to solve complex real world problems for decision support.
5. To choose the appropriate technologies, algorithms, and approaches for the related issues.

**Nature of Course**

Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	4	3	3	2	3	2	4	3	3	3.2
CO2	3	2	3	3	3	2	3	3	3	3	3	3.1
CO3	3	3	3	2	4	3	3	4	3	4	3	3.5
CO4	2	3	3	2	4	3	3	3	3	3	2	3.1
CO5	3	3	2	4	2	3	4	3	2	2	2	3.0
									Mean Overall Score			3.18

**Result: The Score for this course is 3.18 (High Relationship)**

**Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: A. SARASWATHI**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 3</b>	<b>COURSE CODE: P21CS4C13</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - IV SEMESTER CORE COURSE - XIII</b> (For the candidates admitted from the year 2021-22 onwards) <b>OPEN SOURCE TECHNOLOGIES</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To defining the architecture and implementation of open source based Learning Management Systems.</li> <li>2. To expose students the open source software environment and made them to familiarize open source packages.</li> <li>3. To demonstrate different open source technologies like Linux, PHP &amp; My SQL.</li> </ol>	
<b>UNIT I</b>	Introduction: Open Source - Open Source vs. Commercial Software - What is Linux? -Free Software -Where I can use Linux? Linux Kernel - Linux Distributions.
<b>UNIT II</b>	Introduction: Linux Essential Commands - File system Concept - Standard Files - The Linux Security Model - Vi Editor-Partitions creation-Shell Introduction - String Processing- InvestigatingandManagingProcesses-NetworkClients-Installing Application.
<b>UNIT III</b>	Introduction - Apache Explained - Starting, Stopping, and Restarting Apache-Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Don't Allow public html Web sites-Apache control with .hta Access
<b>UNIT IV</b>	Introduction to MY SQL - The Show Databases and Table - The USE command - Create Database and Tables - Describe Table - Select, Insert, Update, and Delete statement - Some Administrative detail - Table Joins - Loading and Dumping Database.
<b>UNIT V</b>	PHP Introduction - General Syntactic Characteristics - PHPS cripting - Commenting your code - Primitives, Operations and Expressions - PHP Variables - Operations and Expressions Control Statement-Array - Functions – Basic Form Processing - File and Folder Access - Cookies -Sessions - Database Access with PHP - My SQL - My SQL Functions-Inserting Records-Selecting Records - Deleting Records - Update Records.
<b>TEXT BOOK</b>	
"Open Source Web Development with LAMP using Linux, Apache, My SQL, Perl and PHP", James Lee and Brent Ware, Dorling Kindersley (India) Pvt. Ltd, 2008.	
<b>REFERENCES BOOK</b>	
"Setting up LAMP: Getting Linux, Apache, My SQL, and PHP and working Together "Eric Rose brock, Eric Fil son, Published by John Wiley and Sons, 2004.	

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

**COURSE OUTCOMES:**

1. To students are exposed to use open source software environment.
2. To understanding of server side programming in an effective manner.
3. To inculcate to the students to use appropriate database for real time applications.
4. To develop the design aspect of new emerging technologies using PHP.
5. Ability to gather information about Free and Open Source Software projects from software releases and from sites on the internet.

<b>Nature of Course</b>			
Knowledge and skill	✓	Employability oriented	✓
Skill oriented	✓	Entrepreneurship oriented	✓

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	2	2	3	4	4	3	3	3.18
CO2	3	4	2	4	4	3	3	4	3	3	3	3.27
CO3	3	3	3	4	3	4	3	3	2	4	4	3.27
CO4	3	2	4	3	4	3	2	2	3	3	3	2.90
CO5	3	3	4	4	3	2	3	3	4	3	4	3.27
									Mean Overall Score			3.17

**Result: The Score for this course is 3.17 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. A. VINAYAGAM**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT: 3**

**COURSE CODE: P21CS4C14P**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., COMPUTER SCIENCE - IV SEMESTER CORE COURSE - XIV**  
(For the candidates admitted from the year 2021-22 onwards)

**OPEN SOURCE TECHNOLOGIES LAB**

**COURSE OBJECTIVES**

1. To know the working methods of basic commands in Linux.
2. To implement mathematical and string functions using control structure.
3. To understand how to create the web pages and websites.

**PROGRAMS**

1. Demonstrate Basic Linux commands.
  2. Write Linux Shell Script Program to find Area of Square, Rectangle, Circle.
  3. Write Linux Shell Script Program to print your Address 'n' times.
  4. Write Linux Shell Script Program to reverse a number.
  5. Write Linux Shell script Program to accept a character and check whether it is an
    - a. Lower case alphabet
    - b. Upper case alphabet
    - c. A digit
    - d. Special symbol
    - e. Vowel
- Using case control structure
6. Write a program to containing coolers and color codes generated by mixing PHP with HTML.
  7. To create personal to do list using PHP.
  8. Build a login form in PHP using My SQL.
  9. Write a program to tracking previous visit to a page.
  10. Design a web form for place on order validating input using PHP.

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**



**COURSE OUTCOMES:**

1. To students can know about the importance of Linux library functions and system calls.
2. To understand, analyze and apply the role of languages like HTML, PHP, Linux, My SQL and Apache.
3. To build web applications using PHP with My SQL.
4. To effectively use software development tools including libraries, preprocessors, compilers, Linkers, and make files.

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	4	3	4	4	3	3	3.45
CO2	3	4	3	4	3	4	3	4	3	3	3	3.36
CO3	3	4	3	4	3	4	3	3	3	4	4	3.45
CO4	4	3	4	3	4	3	3	3	4	3	3	3.36
									Mean Overall Score			3.41

**Result: The Score for this course is 3.41 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. A. VINAYAGAM**

**CHAIRMAN-BOS**

**CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 3</b>	<b>COURSE CODE: P21CS4E4</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - IV SEMESTER ELECTIVE COURSE - IV</b> (For the candidates admitted from the year 2021-22 onwards) <b>BIG DATA ANALYTICS</b>	
<b>COURSE OBJECTIVES</b>	
<ol style="list-style-type: none"> <li>1. To impart knowledge in fundamentals of Big Data.</li> <li>2. To gain the knowledge of Big Data Analytics.</li> <li>3. To analyze and compare the big data and data base technologies.</li> <li>4. To analyze the Hadoop and Mongo DB fundamentals.</li> <li>5. To gain the knowledge of Apache-Cassandra.</li> </ol>	
<b>UNIT I</b>	Types of digital data: Unstructured - Semi-structured and Structured- Introduction to Big Data - Characteristics of data - Evolution - Definition of Big Data and Challenges with big Data - What is Big Data?- Why Big Data? - A Typical Data Warehouse environment.
<b>UNIT II</b>	Big Data analytics: Introduction - Classification of analytics - Challenges to big data analytics - Data science and Analytics - Terminologies used in Big Data environment.
<b>UNIT III</b>	Big data technology landscape: Introduction to No SQL - Uses- Features and Types- Needs - Advantages, Disadvantages and Applications of No SQL - Overview of New SQL - Comparing SQL - No SQL and New SQL - Introduction and history of Hadoop - Hadoop overview - Hadoop Distributed File System - Processing data with Hadoop.
<b>UNIT IV</b>	Introduction to Mongo DB - Terms used in RDBMS and Mongo DB - Data types - Mongo DB query language- Insert, Save, Update, Remove, Find Methods, Arrays, Aggregate function, Cursors in Mongo DB.
<b>UNIT V</b>	Introduction of Apache - Cassandra - Features of Cassandra - CQL data types - CQLSH- Key spaces - CRUD operations - Hadoop Map Reduce: Introduction - Mapper - Reducer - Combiner - Practitioner - Searching - Sorting - Compression.
<b>TEXT BOOK</b>	
Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016.	
<b>REFERENCES BOOKS</b>	
<ol style="list-style-type: none"> <li>1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014</li> <li>2. “Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, MadhuJagadeesh and HarshaSrivatsa, A press Media, Springer Science + Business Media New York, 2013</li> <li>3. “Mining of Massive Datasets”, AnandRajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.</li> <li>4. “Hadoop: The Definitive Guide”, Tom White, O'Reilly Media, 2010.</li> </ol>	

**COURES OUTCOMES:****CO1:** To introduce the basic concepts of Big data.**CO2:** To know and understand about Big Data analytics and data warehouse environment.**CO3:** Able to get the knowledge about No SQL and data base technologies.**CO4:** To gain the knowledge about Mango DB and its features.**CO5:** To acquire Knowledge in various learning techniques like the features of Apache Cassandra.**Nature of Course**

Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	3	3	3	2	3	3	4	3	3	3.09
CO2	3	4	2	3	3	2	3	3	4	3	3	3.00
CO3	3	4	3	4	3	3	3	4	3	4	3	3.36
CO4	3	3	3	3	4	3	3	4	3	3	3	3.18
									Mean Overall Score			3.16

**Result: The Score for this course is 3. 16 (High Relationship)****Mapping Scale**

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

**COURSE DESIGNER: A. SARASWATHI****CHAIRMAN-BOS****CONTROLLER OF EXAMINATIONS**

<b>CREDIT: 3</b>	<b>COURSE CODE: P21CS4E5</b>
<b>GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.</b> <b>M.Sc., COMPUTER SCIENCE - IV SEMESTER ELECTIVE COURSE - V</b> (For the candidates admitted from the year 2021-22 onwards) <b>SOFT COMPUTING</b>	
<b>COURSE OBJECTIVES</b>	
1. To learn neural networks. 2. To know about various training algorithms. 3. To analyze and gain the knowledge about genetic algorithm.	
<b>UNIT I</b>	INTRODUCTION: Neural Networks: Application Scope of Neural Networks - Fuzzy Logic - Genetic Algorithm - Hybrid Systems - Soft Computing. Artificial Neural Network: An Introduction - Fundamental concept - Evolution of Neural Networks - Basic Models of Artificial Neural Network - Important Terminologies of ANNs-McCulloch - Pitts Neuron - Linear Separability - Hebb Network.
<b>UNIT II</b>	Supervised Learning Network: Introduction - Perceptron Networks - Adaptive Linear Neuron (Adaline) - Multiple Adaptive Linear Neurons - Back-Propagation Network- Radial Basis Function Network.
<b>UNIT III</b>	Associative Memory Networks: Introduction - Training Algorithms for Pattern Association- Auto associative Memory Network - Hetero associative Memory Network - Bidirectional Associative Memory (BAM) - Hopfield Networks - Iterative Auto associative Memory Networks - Temporal Associative Memory Network - Unsupervised Learning Networks: Introduction - Kohonen Self - Organizing Feature Maps - Learning Vector Quantization - Counter propagation Networks- Adaptive Resonance Theory Networks.
<b>UNIT IV</b>	Introduction to Classical Sets and Fuzzy Sets: Introduction - Classical Sets (Crisp Sets) - Fuzzy Sets - Classical Relations and Fuzzy Relations: Introduction - Cartesian Product of Relation - Classical Relation – Fuzzy Relations - Tolerance and Equivalence Relations –Non interactive Fuzzy sets. Defuzzification: Introduction - Lambda - Cuts for Fuzzy Sets (AlphaCuts) - Lambda-Cuts for Fuzzy Relations - Defuzzification Methods.
<b>UNIT V</b>	Genetic Algorithm: Introduction - Basic Operators and Terminologies in GAs - Traditional Algorithm vs. Genetic Algorithm - Simple GA - General Genetic Algorithm - The Schema Theorem - Classification of Genetic Algorithm - Holland Classifier Systems - Genetic Programming - Applications of Soft Computing.
<b>TEXT BOOK</b>	
1. S.N.Sivanandam, S.N. Deepa, "Principles of Soft Computing ", Wiley-India I Edition 2007.	
<b>REFERENCES BOOK</b>	
1. Dilip K. Pratihar, "Soft Computing Fundamentals and Applications ", Narosa Publishing House Edition.	

**COURSE OUTCOMES:**

1. To learn about how to make the computers think by itself.
2. Able to understand various training algorithms
3. To impart the knowledge of Fuzzy concept to the real world application
4. To provide the mathematical background for optimization associated with soft computing
5. To analyze the genetic algorithm and their applications.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

**MAPPING**

Course Outcome	Program Outcomes						Program Specific Outcomes					Average
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	3	3	3	4	4	3	3.36
CO2	3	4	3	3	2	4	3	3	4	3	4	3.27
CO3	3	4	3	4	3	4	3	4	3	4	3	3.45
CO4	3	3	3	3	4	3	4	4	3	3	3	3.27
CO5	3	4	3	4	3	3	4	3	4	3	3	3.36
									Mean Overall Score			3.34

**Result: The Score for this course is 3.34 (High Relationship)**

**Mapping Scale**

<b>Mapping</b>	<b>1-20%</b>	<b>21-40%</b>	<b>41-60%</b>	<b>61-80%</b>	<b>81-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Relation</b>	<b>0.0-1.0</b>	<b>1.1-2.0</b>	<b>2.1-3.0</b>	<b>3.1-4.0</b>	<b>4.1-5.0</b>
<b>Quality</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**COURSE DESIGNER: Dr. A. BANUMATHI – Dr. A. VINAYAGAM**

**CHAIRMAN–BOS**

**CONTROLLER OF EXAMINATIONS**

**CREDIT : 3****COURSE CODE:P21CS4PW****GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.****M.Sc., COMPUTER SCIENCE - IV SEMESTER**

(For the candidates admitted from the year 2021-22 onwards)

**PROJECT WORK**

<b>SL.NO</b>	<b>AREA OF WORK</b>	<b>MAXIMUM MARKS</b>
<b>1</b>	<b>Project work</b>	
	(i) Plan of the Project	<b>20</b>
	(ii) Execution of the plan / Collection of data / Organization of materials / Fabrication Experimental study / Hypothesis, Testing etc., and Presentation of the report.	<b>45</b>
	(iii) Individual Initiative	<b>15</b>
<b>2</b>	VIVA VOCE EXAMINATION	<b>20</b>
<b>TOTAL</b>		<b>100</b>

**Minimum Pass Mark: 50 Marks****CHAIRMAN–BOS****CONTROLLER OF EXAMINATIONS**

**CREDIT : 4****COURSE CODE:P21CO4PW**

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR – 639005.**  
**M.Sc., MASTER OF COMPUTER SCIENCE - IV SEMESTER**  
(For the candidates admitted from the year 2021-22 onwards)

**PROJECT WORK**

<b>SL.NO</b>	<b>AREA OF WORK</b>	<b>MAXIMUM MARKS</b>
<b>1</b>	<b>Project work</b>	
	(i) Plan of the Project	<b>20</b>
	(ii) Execution of the plan / Collection of data / Organization of materials / Fabrication Experimental study / Hypothesis, Testing etc., and Presentation of the report.	<b>45</b>
	(iii) Individual Initiative	<b>15</b>
<b>2</b>	VIVA VOCE EXAMINATION	<b>20</b>
	<b>TOTAL</b>	<b>100</b>

**CHAIRMAN–BOS****CONTROLLER OF EXAMINATIONS**