E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
(Accredited by NAAC with 'A' Grade and NBA)
Email: principal@egspec.org website: www.egspec.org Ph: 04365-251112

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES

ACADEMIC YEAR

2021-2022

Name of the value added courses offered	Program	No. of times offered during the same year	Duration of course	Number of students enrolled in the year	Number of Students completing the course in the year
Virtualization of Data Centre in Cloud	UG	1	42 Hours	83	83
Introduction to R	UG	2	40 Hours	129	129
Comparative Study of C with Python Programming	UG	2	40 Hours	136	136
Data Analytics in R	PG	1	40 Hours	24	24

HOD/CSE

HEAD OF THE DEPARTMENT
DEPARTMENT OF CSE
E.G.S.P. Engineering College,
Nagapattinam - 611 002

ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

E.G.S. PILLAY ENGINEERING COLLEGE, NAGAPATTINAM

(AUTONOMOUS)

DEPARTMENT OF CSE

Organized

VALUE ADDED COURSE

ON

VIRTUALIZATION OF DATACENTRE IN CLOUD

Convener
Prof Dr. M. Chinnadurai
Professor and Head
Department of CSE
E.G.S Pillay Engineering College
Nagapattinam - 611002

Course developed and coordinated by
1. Prof J. Noorul Ameen M.E, D.Acu.,
   Assistant Professor
   Department of CSE
   E.G.S Pillay Engineering College
   Nagapattinam - 611002

2. Dr. R. Manivannan M.Tech, Ph.D.,
   Associate Professor,
   Department of CSE,
   E.G.S Pillay Engineering College,
   Nagapattinam - 611002

3. Prof B. Ranjani M.E.,
   Assistant Professor
   Department of CSE
   E.G.S Pillay Engineering College
   Nagapattinam - 611002

E. G. S. PILLAY ENGINEERING COLLEGE, NAGAPATTINAM.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSE

ON

VIRTUALIZATION OF DATA CENTRE IN CLOUD

TABLE OF CONTENT

HEAD OF THE DEPARTMENT
DEPARTMENT OF CSE
E.G.S.P. Engineering College,
Nagapattinam - 611 002

ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi Nagore
Nagapattinam, Tamilnadu.

PERMISSION LETTER

Date: 25.10.2021

From

Mr.J.NoorulAmeen,
Assistant Professor/CSE,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

To

The Principal,
E.G.S.Pillay Engineering College,
Nagapattinam.

Through

The Head of Department,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

Respected Sir,

Sub: Request to conduct Value Added Course – Reg

We are happy to inform you that we have planned to conduct a value added course titled **"Virtualization of Data Centre in Cloud"** for UG IV CSE Students from 01.11.2021 to 20.11.2021 through google classroom. Herewith, I have enclosed name list and session details. Kindly give permission for conducting value added course.

Thanking you,

yours faithfully,

[Mr.J.NoorulAmeen]

HEAD OF THE DEPARTMENT
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E.G.S. Pillay Engineering College,
Nagapattinam - 611 002

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Convenor

Prof.Dr.M.CHINNADURAI

Professor & Head / CSE

Course Coordinators

Dr.R.MANIVANNAN

ASSOCIATE PROFESSOR/CSE,

Prof.J.NOORUL AMEEN

ASSISTANT PROFESSOR / CSE

&

Mrs.B.RANJANI

ASSISTANT PROFESSOR / CSE

Resource Person

Prof.J.NOORUL AMEEN

ASSISTANT PROFESSOR / CSE

Industry Person

Mr.Marban,

Vi Microsystem Private Limited,
Chennai.

Course Duration : 42 Hours

Learning Mode

Google Classroom

ABOUT THE COLLEGE

EGS Pillay Engineering College was started in the year 1995 under the sponsorship of G. S. Pillay & Sons Educational and Charitable Trust. College has gained the reputation of being most preferred engineering college by the students. College is approved by the AICTE, New Delhi and is affiliated to Anna University from 2002 and the degrees are awarded by Anna University, as per the Government Orders. It is ISO 9001:2008 certified.

The College has earned the reputation of being one of the most preferred colleges by the students and parents all these years. Known for its excellent infrastructure and facilities for learning, the outstanding non-grant engineering college has registered impressive performance consistently. A gate-way to success, the college has now set on long-range planning to enlarge and enrich its programs and activities to empower the youth who aspire to become successful Engineers, Scientists and Managers.

Value Added Course on

Virtualization of Data Center in Cloud

Organized by

Department of Computer Science and Engineering

ABOUT THIS COURSE

We have designed a online value added course on Data Center Virtualization and Cloud Computing to gain basic knowledge of Data Center Virtualization and Cloud Computing.

This course consist of following modules--

Module 1: Introduction to Data Center Virtualization

Module 2: Components of VMware vSphere with VMware vSphere

Module 3: How does all fits together?

Module 4:Task Scheduling in Data Center

Course Outcomes:

After completion of the course, Student will be able to

1. Define and describe the need for data center virtualization
2. Provide an overview of features of vSphere 5.5
3. Understand how VMware's products helps to solve business and technical challenges with regard to data center virtualization

Beneficiaries

2018-22 Batch
UG CSE Students

Date:
01.11.21-20.11.21

Certificate will be issued to all participants on successful completion of this course

Contact us

E.G.S Pillay Engineering College
Old Nagore Road, Thethi Village
Nagapattinam - 611002
Tamil Nadu, INDIA

+91-4365 251112/251114
enquires@egspec.org

ABOUT THE DEPARTMENT

Department of Computer Science and Engineering programme was introduced at Edayathangudy G.S.Pillay Engineering College in the Academic Year 1995-1996. The demand for Computer Engineers in software companies, banking sectors and private sectors engaged in developing new trends of software generation is more than the engineers available.

The department has Recognized Research Centre for doing PhD / M.S. (By Research), obtained Permanent Affiliation from Anna University in the year 2014-15. The department has formed student association namely Computer Engineers Association (CEA) to promote talent of the students and their upliftment. The department has highly qualified and experienced faculties. The department has well experienced faculties in the research and more number of publications in reputed Journals and Conferences.

The department has well infrastructural facilities. From 2011 onwards every year, we are conducting International and National conferences. The B.E (CSE) programme was accredited by NBA in the year 2016 and reaccredited in the year 2019 for next three years.

ATTESTED
Dr. S. RAJABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College
Thethi, Nagapattinam (Dt), Tamil Nadu.

E. G. S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EGSPEC/CSE/UG/VAC/2021-22/01 **Date: 26.10.2021**

CIRCULAR

It is here by informed that Department of CSE is going to organize a Value Added Course on "Virtualization of Data Centre in Cloud" through online mode (Google Classroom) from 01.11.2021 to 20.11.2021 by, **Mr. J. NoorulAmeen , Assistant Professor, Department of Computer Science and Engineering, EGSPEC** for final year UG- CSE Students. All the final year students are instructed to attend the course without fail.

CONVENER

HOD/CSE

HEAD OF THE DEPARTMENT
DEPARTMENT OF CSE
E.G.S.P. Engineering College,
Nagapattinam - 611 002

ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

E.G.S Pillay Engineering College

HOD CSE <hodcse@egspec.org>

Invitation to give expert lecture – reg,

Fri, Oct 22, 2021 at 10:51 AM

HOD CSE <hodcse@egspec.org>
To: techmarban@gmail.com
Bcc:

Respected Sir,

A warm greetings from Department of Computer Science and Engineering, E.G.S. Pillay Engineering College (Autonomous), Nagapattinam.

We are happy to invite you to give expert lecture for value added course on Virtualization of Data Centre in Cloud which is planned to be held from 01/11/2021 to 20/11/2021. I kindly request you to accept our invitation.

Herewith I have attached the syllabus for value added course on Virtualization of Data Centre in Cloud for your kind perusal.

Thanks and Best Regards
--
Dr.M.Chinnadurai Ph.D.,
Head of the Department,
Department of Computer Science and Engineering,
E G S Pillay Engineering College,
Nagai.

value added course_VDC.docx
207K

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

Marban <techmarban@gmail.com> Fri, Oct 22, 2021 at 2:56 PM
To: HOD CSE <hodcse@egspec.org>

Dear Sir

Thank you very much for inviting me for expert lecture for value added course on Virtualization of Data Centre in cloud.

Looking forward to meet you all on November 1, 2021.

Regards,

Marban

VI Microsystem Pvt Ltd

Chennai

ATTESTED
Dr. S. RAMABALAN, M.E., Ph.D.,
PRINCIPAL
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Thethi Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous) NAGAPATTINAM

DEPARTMENT OF CSE

Virtualization of Data Centre in Cloud

We have designed a online value added course on Virtualization of Data Centre in Cloud to gain basic knowledge of Data Center Virtualization and Cloud Computing.

This course consist of following modules (**Syllabus**)

1. Module 1: Introduction to Data Center Virtualization with VMware vSphere –10 Hours
2. Module 2: Components of VMware vSphere – 10 Hours
3. Module 3: How does all fits together? – 10 Hours
4. Module 4: Task Scheduling in Data Centre – 10 Hours
5. Assessment Test – 2 Hours

Course developed and coordinated by

Dr. R. Manivannan M.Tech, Ph.D.,
Associate Professor,
Department of CSE,
E.G.S Pillay Engineering College,
Nagapattinam - 611002

Prof B. Ranjani M.E.,
Assistant Professor
Department of CSE
E.G.S Pillay Engineering College
Nagapattinam - 611002

Prof J. Noorul Ameen M.E, D.Acu.,
Assistant Professor
Department of CSE
E.G.S Pillay Engineering College
Nagapattinam - 611002

Convenor

Prof Dr. M. Chinnadurai
Professor and Head
Department of CSE
E.G.S Pillay Engineering College
Nagapattinam - 611002

Industry Person

Mr.Marban,

Vi Microsystem Private Limited,

Chennai.

Course Duration : 42 Hours

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Dr. S. RAMABALAN, M.E., Ph.D.,
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DEPARTMENT OF CSE

Virtualization of Data Centre in Cloud

Program Schedule

S. No	Date	Module	Topic
1.	01/11/2021	Module 1	Introduction to Data Center Virtualization with VMware vSphere
2.	06/11/2021	Module 2	Components of VMware vSphere
3.	12/11/2021	Module 3	How does all fits together?
4.	16/11/2021	Module 4	Task Scheduling in Data Centre
5.	-	Test	Assessment Test (Conducted at the end of each module)
6.	20/11/2021	Hands on Training	Hands on training on VMware vSphere

Mode: Online (Google Classroom)

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SYLLABUS

		VIRTUALIZATION OF DATA CENTRE IN CLOUD	**L**	**T**	**P**	**C**
						1
Course Objectives:						
		1. Define and describe the need for data center virtualization				
		2. Discuss the features of VMware vSphere				
		3. Describe how tasks are schedule in data centre				
Module I	**INTRODUCTION TO DATA CENTER VIRTUALIZATION WITH VMWARE VSPHERE**					**10 Hours**
Introduction, Business challenges, Technical challenges, VSphere 5.5 Overview, Virtualization, Virtual architecture, Introduction to virtual machines, Hypervisor						
Module II	**COMPONENTS OF VMWARE VSPHERE**					**10 Hours**
Virtual machines, ESXi Hypervisor, vCenter and its features, Storage and virtual networking, vCenter operation manager, vCenter configuration manager, vCenter site recovery manager						
Module III	**HOW DOES ALL FITS TOGETHER?**					**10 Hours**
Availability solutions, Scalability solutions, Optimization solutions, Management solutions						
Module IV	**TASK SCHEDULING IN DATA CENTRE**					**10 Hours**
Task Scheduling – Server Provisioning – Data Centre Scheduling with Network tasks –Task Scheduling Algorithms – Resource Allocation						
				Total:		**40 Hours**
Course Outcomes:						
	After completion of the course, Student will be able to					
CO1	Define and describe the need for data center virtualization					
CO2	Provide an overview of features of vSphere 5.5					
CO3	Understand how tasks are scheduled in Cloud data centre					
References:						
1. https://www.vmware.com/in/learning.html?gclid=CjwKCAjwmeiIBhA6EiwAuaeFV324maDxz5wIhhadQlBYR9WQCj_azXx-caB peTJ1WVQJeITv71XxoCeHAQAvD_BwE						
2. Cloud Infrastructure and Services EMC2 Bangalore Book						

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E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course - ENROLLMENT LIST

"VIRTUALIZATION OF DATA CENTRE IN CLOUD"

S.NO	REGISTER NUMBER	NAME OF THE STUDENT
1.	E18CSR001	AAKASH A
2.	E18CSR002	ABDUL AZEES A
3.	E18CSR003	ABDUL HAMEED M
4.	E18CSR004	ABINESH B
5.	E18CSR005	AJAYVENGATESH S
6.	E18CSR006	AKALYA L
7.	E18CSR007	AKASH U
8.	E18CSR008	AKILA A
9.	E18CSR010	AMEEN MARZOOK S
10.	E18CSR011	ANBU DEVI R
11.	E18CSR012	ANUSUYA S
12.	E18CSR013	ARULRAJ G
13.	E18CSR014	ARUNESH D
14.	E18CSR015	AYYAPPAN S
15.	E18CSR016	BALA B
16.	E18CSR017	BANU PRIYA B
17.	E18CSR018	BAVADHARANI I
18.	E18CSR020	CHITRA S
19.	E18CSR022	DINESH D
20.	E18CSR023	GAYATHRI K
21.	E18CSR025	GOWSALYA R
22.	E18CSR026	GUNASUNDARI M
23.	E18CSR028	HARINI K
24.	E18CSR029	HARISH V
25.	E18CSR030	HENCYSOWMIYA C
26.	E18CSR031	JAYA A
27.	E18CSR032	JAYAPREETHI G
28.	E18CSR033	JAYASRI M
29.	E18CSR034	KABILAN G
30.	E18CSR035	KARTHIKESAN G
31.	E18CSR036	KEERTHANA A
32.	E18CSR037	KUBERAN R
33.	E18CSR039	LOGESHWARAN N
34.	E18CSR041	MANIKANDAN M
35.	E18CSR042	MANIKANDAN R
36.	E18CSR043	MANIMARAN D
37.	E18CSR044	MOHAMED FARVEEZ B
38.	E18CSR046	MUNIYANDI M
39.	E18CSR047	MUTHULAKSHMI K

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40.	E18CSR048	NAVEEN S
41.	E18CSR049	NIRANJAN S
42.	E18CSR050	NITHYA V
43.	E18CSR051	NOORMOHAMED M
44.	E18CSR052	PARTHASARATHI R
45.	E18CSR053	PASUBATHI K
46.	E18CSR054	PAVITHRA A
47.	E18CSR055	PRATHEESHA E
48.	E18CSR056	RAGAVI R
49.	E18CSR057	RAJAGOPAL B
50.	E18CSR058	RAJAVEL S
51.	E18CSR060	SAILAKSHMI S
52.	E18CSR062	SAKTHIVEL L
53.	E18CSR063	SANTHIYA L
54.	E18CSR064	SANTHOSHRAJ S
55.	E18CSR065	SAYAD ABDUL RAHMAN A
56.	E18CSR066	SELVAMANIKANDAN PR
57.	E18CSR067	SHAFEEQ S
58.	E18CSR070	SIVASURYA V
59.	E18CSR071	SNEKA R
60.	E18CSR072	SUBHASHINI S
61.	E18CSR073	SUGANDHINI A
62.	E18CSR074	SUSHMA S
63.	E18CSR075	SUVETHA B
64.	E18CSR076	TAMILMATHI S S
65.	E18CSR077	TAMILMARAN D
66.	E18CSR078	THAMIZHPRIYA M
67.	E18CSR079	UDHAYAPRIYA U
68.	E18CSR080	VARUN KUMAR K
69.	E18CSR081	VELAYUTHAM K
70.	E18CSR083	VIJAYAKUMARY S
71.	E18CSR084	VISHNUPRIYA S
72.	E18CSR085	VISHWA S
73.	E18CSL301	ARAVINTH M
74.	E18CSL302	GOKULNATH S
75.	E18CSL303	KEERTHIGA K
76.	E18CSL305	NESAPRIYA M
77.	E18CSL306	PADMASRI G
78.	E18CSL307	SANJAYBHARATHI T
79.	E18CSL308	SANKAR S
80.	E18CSL309	SASHWAR MOSES S
81.	E18CSL310	SASIPRINCE D
82.	E18CSL311	SUSHMITHA B
83.	E18CSL312	VIKNESH M

Course Coordinator

ATTESTED

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STUDY MATERIAL

Introduction

Data Center Virtualization

Data center virtualization typically uses virtualization software along with cloud computing technology to replace traditional physical servers and other equipment housed in a physical data center.

A data center that uses virtualization in data centers, sometimes referred to as a Software Defined Data Center (SDCC), allows organizations to control their entire IT framework as a singular entity—and often from a central interface. The approach can trim capital and operational costs; improve agility, flexibility and efficiency; save IT staff time and resources; and allow businesses to focus on core business and IT issues.

Research firm MarketersMedia reports that the global data center virtualization market is projected to grow by 8 percent annually from 2017 through 2023. That would make data center virtualization a U.S. $10 billion market. Virtualization of a data center and all its hardware components—including servers, storage, and appliances—isn't a new concept (it dates back to the 1960s). But now, advances in cloud computing, software and other components have made the concept viable and even desirable.

Understanding Virtualization of the Data Center-

Understanding what virtualization of a data center means is critical to proper management of that facility. A number of related terms are used with the concept of virtualization—sometimes interchangeably. They may refer to the same thing, they sometimes overlap, and they also can mean something different.

These include:

Server virtualization

This approach to virtualization abstracts the physical hardware by creating a virtual server, typically running in a cloud infrastructure. This masks server resources, processors and operating systems. Server virtualization uses a hypervisor to coordinate processes and instructions with the central processing unit (CPU). A virtual server can operate on-premises or offsite in a virtual data center.

Big Data virtualization

This technique of Big Data virtualization produces a virtual framework for big data systems. It transforms logical data assets into virtual assets. This abstraction layer makes it easier to access data, it typically speeds data access, and it simplifies the management of data.

Virtualization in the data center

This framework, as the name implies, abstracts all physical elements of a data center and creates virtual elements. It can eliminate the need for a physical space to house hardware.

Virtual data center

This term refers to a pool of cloud-based servers and systems that operate as a single virtualized data center rather than a collection of physical assets.

INTRODUCTION TO VIRTUAL MACHINES AND HYPERVISORS

Virtualization is a constantly evolving process, with new platforms introducing tools every day that are designed to make the process of moving to the cloud simpler.

Regardless of which platform you choose to virtualize your machines and servers, there are some core concepts you'll need to know to get the process of virtualizing your setup underway and see it through to completion.

Given the nature of today's cloud and hybrid environments, it's vital to understand how virtual machines and hypervisors work together to replicate the functions of a traditional computing setup while using fewer resources and equipment.

With knowledge of how a virtual machine (VM) and hypervisor work together, you can help ensure resources are allocated and managed properly upon deployment of a virtual computing network.

WHAT IS A VIRTUAL MACHINE?

A virtual machine is designed to mimic the function of a physical computing device or server using cloud-based parts known as virtual hardware devices.

These virtual hardware devices mimic physical computing components to function as a traditional computer and server setup.

Using virtual RAM, a virtual desktop, and a cloud-based CPU, the virtual machine can perform many of the tasks a traditional machine does without the need for as much physical equipment to power it. The virtual machine is stored within a part of the host computer separately from other resources. The VM software and any apps that run together with it are known as guests.

There can be two types of virtual machines. While process VMs only run a single process at a time, system VMs work to replicate an entire operating system and any required applications to give the same functions as a desktop. Several process VMs may run at once within the system VM setup to make a virtual desktop setup possible.

While many platforms exist to build and run a virtual machine, each with its own features and tools, there are some common traits and characteristics that each virtualization vendor possesses.

These typically include the ability to build and run several virtual machines simultaneously on the same host but keep them apart for the average user's purposes.

These machines are isolated so they run separately, with the users of one virtual machine unable to access or view another running on the same host. This sandbox, as it's known, allows operating systems and apps to run independently.

One of the best reasons for virtualization within an enterprise can be the ability to add more machines to the same server easily. Deploying and managing a new machine is much simpler when using virtual resources than physical ones, as the administrator doesn't need any new equipment.

Resources can simply be reallocated to allow another virtual machine to run on the same server. To create a new virtual machine, most administrators will use a hypervisor. This allows for easy creation and management of multiple virtual machines as needed.

WHAT IS A HYPERVISOR?

A hypervisor is a mandatory component that makes it possible for the virtual machine to run and is sometimes called a virtual machine monitor. A hypervisor's main job is to decouple the hardware powering the network from the operating system and other software running on the virtual machine.

It isolates each virtual machine, allowing them to run separate operating systems simultaneously and protecting them from potential security issues. It also allows each virtual hardware setup to share the physical resources that power the machines that keep them running by dynamically sharing resources like RAM and bandwidth.

With enough historical data gathered from the system, the software can begin to predict how the need for resources changes through the day and identify patterns, automating the movement of resources to and from the cloud to the VMs that need them. By setting protocols for each operating system to follow, the hypervisor keeps the virtual machine from crashing while this is happening. Proper allocation of resources keeps the virtual machine running and prevents any issues with programs competing for resources like RAM.

The hypervisor keeps each virtual machine separate so that if one crashes or experiences a fatal error, the others continue to run without issue. Through sandboxing, users of a VM can try using new apps or operating systems without fear of them crashing the whole system. With cybercrime being a critical issue for enterprises, this also ensures that if a malware attack is effective on one machine, the others will be protected from the same fate. This separation between virtual machines enforced by the hypervisor provides an extra layer of security by preventing one machine from causing an issue with another one.

Three modules exist within the hypervisor. First, the dispatcher routes the directions of each virtual machine instance to the allocator or the interpreter for execution. With these directions sent, the allocator responds to the dispatcher's commands to determine the resources needed and allocates them. Last, the interpreter module has stored routines that are executed based on the allocator's commands.

There are two types of hypervisors in popular use:

- Type 1, also called native or bare metal. This type of hypervisor runs on the host directly, using simple programming that doesn't require its own operating system to function. With a Type 1 hypervisor running, the host machine must be dedicated to this task.
- Type 2, a hosted hypervisor. This software runs through an app instead of on the host itself by using the host computer's operating system to carry out its commands. A Type 2 hypervisor may function slower than a Type 1, as all of its commands must be filtered through the host computer's operating system, creating a lag time.

WHY USE A VIRTUAL MACHINE AND HYPERVISOR?

Moving to virtualization is becoming standard for enterprises that want to stay remote in a post-COVID-19 world. Not only will virtualizing machines and the user desktop give employees

more flexibility, but executives can also see lowered operational expenses and better reliability from a virtual setup.

There are several reasons to switch from a conventional setup to a virtual one, including:

REDUCE OPERATIONAL COST

Cutting operational costs by using computing resources optimally. Underused server space can be cut from the budget as all of your virtual machines can operate on the same virtual server.

Many businesses pay the maintenance costs for an entire server though they only use a fraction of it, or even pay for multiple servers that are only partially used. Combining virtual machines on one server saves on these maintenance costs and reduces the amount of maintenance time needed from your IT team, as they can focus on only one virtual server.

IMPROVE SERVER RELIABILITY

Increase server reliability and decrease instances of downtime. Automated backups to the cloud through screenshots taken by the virtual server allow you to pinpoint the moment of any disruption in your data collection and restore your data to that point.

Having an easily deployable backup helps prevent you from having to deal with ransomware demands or reconstructing your database from scratch in case of a natural disaster or loss of service.

SCALE UP AND DOWN MORE EASILY

With a virtual storage setup, any extra resources are stored in a pool in the cloud for easy access. If a virtual machine needs more RAM or computing power, it can easily be reallocated from the cloud to where it is needed. Compare this to a physical setup where the IT professional has to order additional components and wait for them to arrive before the issue can be addressed. Through elastic infrastructure scaling, these resources can automatically be reduced when the virtual machine no longer needs them, eliminating waste and keeping cloud computing costs manageable.

REDUCE YOUR CARBON FOOTPRINT

The heat generated in a server room when rows of physical machines are present can be significant, with most data centers needing to run air conditioning nonstop to keep the equipment at an optimal temperature. While this may be necessary, it's not the most Earth-friendly approach. If your company wants to decrease its carbon footprint, using one physical server to create a virtual setup that hosts many machines instead of multiple physical servers is a good way to start.

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Value Added Course Assessment Questions

Introduction to Data Centre Virtualization and Cloud Computing

MODULE 1

1. Which is the process of creating virtual versions of physical components?

A.Cloning

B.Virtualization

C.Snapshot

D.Replication

2. Virtual architecture consist of

A.Virtualizing

B.Consolidating

C.Automating

D.All the above

3. Virtualization allows to add components without rebooting

A.True

B.False

4. Which is managed by Vcenter Server

A.Virtual machine monitor

B.Hypervisor

C.Hot spare

5. Which of the following is an example for hosted hypervisor

A.Esxi server

B.Zoomla server

C.VMware workstation

D.All the above

6. Bare metal hypervisors are installed in a physical machine

A.With operating system

B.Without operating system

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C.With compiler

D.None of the above

7. Data center virtualization is typically performed using bare metal hypervisor

A.True

B.False

8. Virtualization breaks the cycle of

A.Power consumption

B.Backup

C.Storage requirement

D.All the above

9. Which is a set of resource available for assignment to a project tasks

A.Storage pool

B.Compute pool

C.Resource pool

D.None of the above

10. Virtualization allows to quickly upgrade or replace components

A.True

B.False

Answers

1	2	3	4	5	6	7	8	9	10
B	D	A	B	C	B	A	D	C	A

MODULE 2

1. Which of the following provide system resource access to virtual machines?

A. VMM

B. VMC

C. VNM

D. All of the mentioned

2. Point out the correct statement.

A. A virtual machine is a computer that is walled off from the physical computer that the virtual machineis running on

B. Virtual machines provide the capability of running multiple machine instances, each with their own operating system

C. The downside of virtual machine technologies is that having resources indirectly addressed means there is some level of overhead

D. All of the mentioned

3. An operating system running on a Type _____ VM is full virtualization.

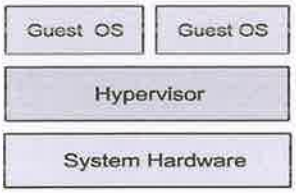
A.1

B.2

C.3

D. All of the mentioned

4. Which type of Hypervisor is shown in the following figure?



A. Type 1

B. Type 2

C. Type 3

D. All of the mentioned

5. Which of the following is another name for the system virtual machine?

A. Hardware virtual machine

B.Software virtual machine

C.Real machine

D. None of the mentioned

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6. What are the Automation Levels on a DRS Cluster?

A.Manual, Partially Automatic, Fully Automatic

B.Manual, Partially Automated, Fully Automated

C.Manual, Semi Automated, Fully Automatic

D.Manual, Semi-Automatic, Automatic

7. You are asked you to setup 4 ESXi hosts to evaluate the new vSphere 5 release, which is the recommended install method to use in this situation?

A.Interactive Installation

B.Scripted Installation

C.vSphere Auto Deploy Installation

D.Upgrade via VMware Update Manager

8. Your colleague has accidentally allocated more vRAM than your company are licensed for. What will happen to your virtual machines?

A.All VM's will be Powered Off

B.New VM's cannot be Powered On

C.VMware will be notified

D.Nothing will happen

9. Which new feature of vSphere 5 is used to collect host core dumps?

A.vMA 5.0

B.ESXi Dump Collector

C.ESXi Syslog Collector

D.VMware vDR 2.0

10. You have been asked to provide high availability for your vCenter server. Which product would you use to help achieve this?

A.Fault-Tolerance

B.vCenter Linked-Mode

C.vCenter Heartbeat

D.Microsoft Clustering Services

Answers

1	2	3	4	5	6	7	8	9	10
A	D	A	A	A	C	A	B	B	D

MODULE 3

1. VMware solution for uninterrupted application usage during hardware failure is?

A.Fault tolerance

B.High availability

C.DRS

D.VSA

2. VMware solution to perform hardware maintenance during business hours?

A.vC Ops

B.vMotion

C.Hot add

D.All the above

3. VMware solution to minimize the downtime caused by hardware failures is?

A.Fault tolerance

B.High availability

C.DRS

D.VSA

4. VMware solution used to test and restore data in entire server is vSphere data protection

A.TRUE

B.FALSE

5. VMware solution for hardware independent replication is

A.vSan

B.vCloud director

C.vSphere Replication

D.None of the above

6. VMware solution for shared storage infrastructure is?

A.VMs

B.Templates

C.VSA

D.All the above

7. To efficiently utilize disk space thick provisioning is used

A.TRUE

B.FALSE

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8.VMware solution for monitoring and reporting performance bottleneck is?

A.VCLOUD NFV Open stack

B.vC Ops

C.Vcenter

D.None of the above

9. To prioritize network traffic of VMs centralized switches with QoS is used

A.TRUE

B.FALSE

10. The need for using data center virtualization is?

A.Saving money

B.Improved response and agility

C.Automation and optimization

D.All the above

Answers

1	2	3	4	5	6	7	8	9	10
A	B	B	A	C	C	B	B	B	D

MODULE 4

1. Which of the following software can be used to implement load balancing?

   A. Apache mod_balancer
   B. Apache mod_proxy_balancer
   C. F6's BigIP

2. Point out the correct statement:

   A. A client can request access to a cloud service from any location
   B. A cloud has multiple application instances and directs requests to an instance based on conditions
   C. Computers can be partitioned into a set of virtual machines with each machine being assigned a workload
   D. All of the mentioned

3. Which of the following type of virtualization is also characteristic of cloud computing?

   A. Storage
   B. Application
   C. CPU
   D. All of the Above

4. Point out the wrong statement :

   A. Abstraction enables the key benefit of cloud computing: shared, ubiquitous access
   B. Virtualization assigns a logical name for a physical resource and then provides a pointer to that physical resource when a request is made
   C. All cloud computing applications combine their resources into pools that can be assigned on demand to users

5. _____ tool is used to create business logic for your application.

   A. Presentation Builder
   B. Business Process Designer
   C. Business Objects Build

6. Which is not a major cloud computing platform?

   A. Google 101
   B. IBM Deep blue
   C. Microsoft Azure
   D. Amazon EC2

7. "Cloud" in cloud computing represents what?

   A. Internet
   B. Wireless
   C. Hard drives
   D. People

8. Which of these should a company consider before implementing cloud computing technology?

A. Employee satisfaction
B. Potential cost reduction
C. Information sensitivity
D. All of the above

9.Which of these companies is not a leader in cloud computing?

A. Google
B. Microsoft
C. Amazon
D. Blackboard

10. What is Cloud Computing replacing?

A. Corporate data centres
B. Expensive personal computer hardware
C. Expensive software upgrades
D. All of the above

Answers

1	2	3	4	5	6	7	8	9	10
C	D	D	C	B	B	A	D	D	D

Value Added Course on Virtualization of Data Centre in Cloud - Assessment 1

Module 1: Introduction to Data Center Virtualization with VMware vSphere - Assessment This

Assessment consists of 10 multiple choice questions. Each Questions carries 5 mark

Email *

tamthi80018@gmail.com

RegisteNumber - Name *

E18CSR076-S.S.TAMIL MATHI

1. Which is the process of creating virtual versions of physical components? * 5 points

- ◯ Cloning
- ◉ Virtualization
- ◯ Snapshot
- ◯ Replication

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2. Virtualization allows to add components without rebooting * 5 points

- (●) True
- ( ) False

3. Virtual architecture consist of * 5 points

- ( ) Virtualizing
- ( ) Consolidating
- ( ) Automating
- (●) All the above

4. Which of the following is an example for hosted hypervisor * 5 points

- ( ) Esxi server Zoomla
- ( ) server
- (●) VMware workstation
- ( ) All the above

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5. Which is managed by Vcenter Server * 5 points

- (●) Virtual machine monitor
- ( ) Hypervisor
- ( ) Hot spare
- ( ) None of the above

6. Data center virtualization is typically performed using bare metal hypervisor * 5 points

- (●) True
- ( ) False

7. Bare metal hypervisors are installed in a physical machine * 5 points

- ( ) With operating system
- (●) Without operating system
- ( ) With compiler
- ( ) None of the above

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8. Virtualization allows to quickly upgrade or replace components * 5 points

- (●) True
- ( ) False

9. Which is a set of resource available for assignment to a project tasks * 5 points

- ( ) Storage pool
- ( ) Compute pool
- (●) Resource pool
- ( ) None of the above

10. Virtualization breaks the cycle of * 5 points

- ( ) Power consumption
- ( ) Backup
- ( ) Storage requirement
- (●) All the above

This form was created inside of E.G.S. Pillay Engineering College.

Google Forms

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Value Added Course on Virtualization of Data Centre in Cloud - Assessment 2(Module 2 : Components of VMwareVSphere)

This Assessment consists of 10 multiple choice questions. Each Questions carries 5 mark

Email *

nithyarajan071@gmail.com

Register No - Name *

E18CSR050

1. Which of the following provide system resource access to virtual machines?Untitled Question * 5 points

- (●) VM
- ( ) M
- ( ) VMC
- ( ) VNM

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2. Point out the correct statement * 5 points

- ○ A virtual machine is a computer that is walled off from the physical computer that the virtualmachineis running on
- ○ Virtual machines provide the capability of running multiple machine instances, each with their ownoperating system
- ○ The downside of virtual machine technologies is that having resources indirectly addressed meansthere is some level of overhead
- ◉ All of the mentioned

3. An operating system running on a Type_____VM is full virtualization * 5 points

- ◉ 1
- ○ 2
- ○ 3
- ○ All of the mentioned

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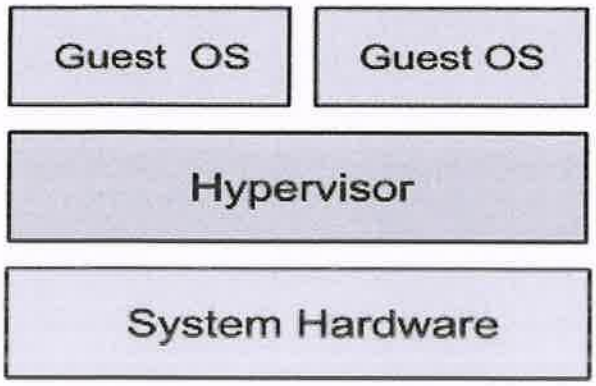
4. Which type of Hypervisor is shown in the following figure? * 5 points



- (●) Type 1
- ( ) Type 2
- ( ) Type 3
- ( ) All of the mentioned

5. Which of the following is another name for the system virtual machine? * 5 points

- (●) Hardware virtual machine
- ( ) Software virtual machine
- ( ) Real machine
- ( ) None of the mentioned

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6. What are the Automation Levels on a DRS Cluster? * 5 points

- ◯ Manual, Partially Automatic, Fully Automatic
- ◯ Manual, Partially Automated, Fully Automated
- ◯ Manual, Semi Automated, Fully Automatic
- ◉ Manual, Semi-Automatic, Automatic

7. You are asked you to setup 4 ESXi hosts to evaluate the new vSphere 5 release, which is the recommended install method to use in this situation? * 5 points

- ◉ Interactive InstallationScripted
- ◯ Installation
- ◯ vSphere Auto Deploy Installation
- ◯ Upgrade via VMware Update Manager

8. Your colleague has accidentally allocated more vRAM than your company are licensed for. What will happen to your virtual machines? * 5 points

- ◯ All VM's will be Powered Off
- ◉ New VM's cannot be Powered On
- ◯ VMware will be notified
- ◯ Nothing will happen

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9. Which new feature of vSphere 5 is used to collect host core dumps? * 5 points

- ○ vMA 5.0
- ◉ ESXi Dump Collector
- ○ ESXi Syslog Collector
- ○ VMware vDR 2.0

10. You have been asked to provide high availability for your vCenter server. Which product would you use to help achieve this? * 5 points

- ○ Fault-Tolerance vCenter
- ○ Linked-ModevCenter
- ◉ Heartbeat
- ○ Microsoft Clustering Services

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DEPARTMENT OF CSE

OUTCOME ASSESSMENT

Value added course on Introduction to Data Centre Virtualization and Cloud Computing

EXPECTED LEVEL OF ATTAINMENT FOR EACH QUESTIONS : 70%

TOTAL NUMBER OF STUDENTS : 84 -1=83

CO Attainment							
S.NO	**REG NUMBER**	**NAME**	**Module 1(100)**	**Module 2(100)**	**Module 3(100)**	**Module 4(100)**	**TEST SCORE**
MARKS TO REACH EXPECTED LEVEL OF			**70**	**70**	**70**	**70**	
1	E18CSR001	AAKASH A	60	60	80	100	300
2	E18CSR002	ABDUL AZEES A	90	100	100	80	370
3	E18CSR003	ABDUL HAMEED M	80	100	90	80	350
4	E18CSR004	ABINESH B	90	100	80	100	370
5	E18CSR005	AJAYVENGATESH S	100	100	70	90	360
6	E18CSR006	AKALYA L	60	100	70	80	310
7	E18CSR007	AKASH U	100	100	100	100	400
8	E18CSR008	AKILA A	70	60	100	100	330
9	E18CSR010	AMEEN MARZOOK S	90	100	70	90	350
10	E18CSR011	ANBU DEVI R	100	60	60	30	250
11	E18CSR012	ANUSUYA S	80	100	100	100	380
12	E18CSR013	ARULRAJ G	100	60	100	100	360
13	E18CSR014	ARUNESH D	80	90	80	80	330
14	E18CSR015	AYYAPPAN S	90	100	100	100	390
15	E18CSR016	BALA B	60	60	100	60	280
16	E18CSR017	BANU PRIYA B	100	80	90	100	370
17	E18CSR018	BAVADHARANI I	80	100	80	60	320
18	E18CSR020	CHITRA S	90	60	60	80	290
19	E18CSR022	DINESH D	90	100	100	100	390
20	E18CSR023	GAYATHRI K	90	100	80	100	370
21	E18CSR025	GOWSALYA R	70	100	100	100	370
22	E18CSR026	GUNASUNDARI M	70	60	80	60	270
23	E18CSR028	HARINI K	100	100	70	90	360
24	E18CSR029	HARISH V	90	60	60	80	290
25	E18CSR030	HENCYSOWMIYA C	80	100	90	100	370
26	E18CSR031	JAYA A	90	100	90	80	360
27	E18CSR032	JAYAPREETHI G	100	100	90	90	380
28	E18CSR033	JAYASRI M	80	60	60	80	280
29	E18CSR034	KABILAN G	60	100	100	100	360
30	E18CSR035	KARTHIKESAN G	90	60	60	90	300
31	E18CSR036	KEERTHANA A	80	100	80	80	340
32	E18CSR037	KUBERAN R	70	60	90	80	300
33	E18CSR039	LOGESHWARAN N	90	100	80	80	350
34	E18CSR041	MANIKANDAN M	60	100	60	50	270

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35	E18CSR042	MANIKANDAN R	100	100	100	100	400
36	E18CSR043	MANIMARAN D	90	90	70	100	350
37	E18CSR044	MOHAMED FARVEEZ B	80	100	60	100	340
38	E18CSR046	MUNIYANDI M	60	100	90	100	350
39	E18CSR047	MUTHULAKSHMI K	60	100	60	70	290
40	E18CSR048	NAVEEN S	90	100	100	100	390
41	E18CSR049	NIRANJAN S	60	100	100	100	360
42	E18CSR050	NITHYA V	60	80	60	60	260
43	E18CSR051	NOORMOHAMED M	80	90	100	100	370
44	E18CSR052	PARTHASARATHI R	100	60	70	70	300
45	E18CSR053	PASUBATHI K	60	100	100	100	360
46	E18CSR054	PAVITHRA A	90	100	70	60	320
47	E18CSR055	PRATHEESHA E	90	100	100	80	370
48	E18CSR056	RAGAVI R	90	90	80	80	340
49	E18CSR057	RAJAGOPAL B	80	90	90	60	320
50	E18CSR058	RAJAVEL S	100	100	70	70	340
51	E18CSR060	SAILAKSHMI S	80	100	80	100	360
52	E18CSR061	SAKTHI SUNDARAM A	0	0	0	0	0
53	E18CSR062	SAKTHIVEL L	60	100	70	90	320
54	E18CSR063	SANTHIYA L	100	100	70	60	330
55	E18CSR064	SANTHOSHRAJ S	80	90	80	100	350
56	E18CSR065	SAYAD ABDUL RAHMAN A	90	100	90	80	360
57	E18CSR066	SELVAMANIKANDAN PR	70	60	60	80	270
58	E18CSR067	SHAFEEQ S	90	100	90	100	380
59	E18CSR070	SIVASURYA V	90	100	80	90	360
60	E18CSR071	SNEKA R	90	100	90	90	370
61	E18CSR072	SUBHASHINI S	90	100	60	100	350
62	E18CSR073	SUGANDHINI A	60	60	100	10	230
63	E18CSR074	SUSHMA S	80	100	60	100	340
64	E18CSR075	SUVETHA B	100	100	90	100	390
65	E18CSR076	TAMILMATHI S S	90	100	80	100	370
66	E18CSR077	TAMILMARAN D	100	100	90	80	370
67	E18CSR078	THAMIZHPRIYA M	70	90	100	100	360
68	E18CSR079	UDHAYAPRIYA U	90	100	80	100	370
69	E18CSR080	VARUN KUMAR K	70	100	90	80	340
70	E18CSR081	VELAYUTHAM K	70	100	80	60	310
71	E18CSR083	VIJAYAKUMARY S	70	60	70	100	300
72	E18CSR084	VISHNUPRIYA S	70	100	80	100	350
73	E18CSR085	VISHWA S	80	60	60	90	290
74	E18CSL301	ARAVINTH M	70	90	100	100	360
75	E18CSL302	GOKULNATH S	60	100	60	100	320
76	E18CSL303	KEERTHIGA K	90	100	60	80	330
77	E18CSL305	NESAPRIYA M	100	90	60	90	340
78	E18CSL306	PADMASRI G	60	90	80	80	310
79	E18CSL307	SANJAYBHARATHI T	80	100	100	100	380

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80	E18CSL308	SANKAR S	70	100	100	100	370
81	E18CSL309	SASHWAR MOSES S	70	100	100	100	370
82	E18CSL310	SASIPRINCE D	60	60	60	80	260
83	E18CSL311	SUSHMITHA B	60	90	60	80	290
84	E18CSL312	VIKNESH M	80	70	100	100	350
TOTAL			6710	7440	6770	7160	
<70 %			20	21	23	14	
>=70%			80	79	77	86	
Range of attainment : 1 (>60), 2 (>70), 3 (>80)							
Mapping with CO			CO1	CO2	CO3	CO1	
Attainment of each CO			3	2.9	2.7	3.6	
Attainment level of each CO			CO1=3.3 , CO2=2.9, CO3=2.7				
Mapping with PO : 1,2,3,12							

ASSESSMENT TOOL	ATTAINMENT LEVEL OF CO1	ATTAINMENT LEVEL OF CO2	ATTAINMENT LEVEL OF CO3
MODULE 1	3		
MODULE 2		2.9	
MODULE 3			2.7
MODULE 4	3.6		
AVERAGE	3.3	2.9	2.7
Overall CO Attainment = 2.9			

CO to PO Mapping

Course Outcome	PO1	PO2	PO3
CO1	1	2	2
CO2	2	3	3
CO3	3	3	3

CO to PSO Mapping

Course Outcome	PSO1	PSO2
CO1	-	1
CO2	2	3
CO3	2	3

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PO Attainment

Course Outcome	PO1	PO2	PO3
CO1	0.7	1.4	2.1
CO2	1.5	2.3	2.3
CO3	2.6	2.6	2.6
AVERAGE	1.6	2	2.3

PSO Attainment

Course Outcome	PSO2
CO1	2.1
CO2	2.3
CO3	2.6
AVERAGE	2.6

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DEPARTMENT OF CSE
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VALUE ADDED COURSE SUMMARY REPORT

1. Name of Course Developer: **MR.J.NOORULAMEEN**
2. Course Developer Details: **ASSISTANT PROESSOR, CSE**
   E.G.S. PILLAY ENGINEERING COLLEGE
3. Date of Course: **01/11/2021 – 20/11/2021**
4. Beneficiary Details: IV CSE (UG)
5. Coordinator: Mr.J.NoorulAmeen (Asst. Prof.CSE, EGSPEC)
   Dr.R.Manivannan(Assoc. Prof.CSE, EGSPEC)
   Mrs.B.Ranjani (Asst. Prof.CSE, EGSPEC)
6. Mode: Online (Google Classroom)

Title: Introduction to Data Centre Virtualization and Cloud Computing Modules:

1. Introduction to Data Center Virtualization with VMware vSphere
2. Components of VMware vSphere
3. How does all fits together?
4. Task Scheduling in Data centre

Course Outcome Attainment:

1. Attainment through Internal Assessment:

Attainment level 1: CO Attainment is >= 60%
Attainment level 2: CO Attainment is >= 70%
Attainment level 3: CO Attainment is >= 80%
Here, The CO Attainment is i.e. 2.9
The correlation level in the Internal Assessment is Moderate i.e. 2 (Attainment level 2)
Therefore, Overall Attainment of the Value added Course Introduction to Data Centre Virtualization and Cloud Computing is Moderate.

INSTRUCTOR REPORT	
Impact of delivery methods:	Students can able to learn the concepts of virtualization clearly.
Course outcome attainment remarks:	Attainment of CO3 is low when compared with other COs. It means that students felt difficult to learn applications and challenges
Student feedback:	Need more explanation on applications and challenges
Scope for improvement:	Motivate the students to learn more on cloud applications
Course coordinator remarks:	More application oriented videos is introduced to students

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE OF COMPLETION

This is to certify that **Ms.K.Gayathri Computer Science and Engineering** has successfully completed value added course on "Virtualization of Data Centre in Cloud" Conducted by Department of Computer Science and Engineering, E.G.S Pillay Engineering College, Nagapattinam through online pedagogy from 01/11/21 to 20/11/21

Dr. R. Manivannan	J. Noorul Ameen	B. Ranjani	Dr. M. Chinnadurai	Dr. S. Ramabalan
Coordinator	Coordinator	Coordinator	HoD	Principal

Certificate ID: YAZW4U-CE000064

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This is to certify that **Mr.S.Naveen Computer Science and Engineering** has successfully completed value added course on "Virtualization of Data Centre in Cloud" Conducted by Department of Computer Science and Engineering, E.G.S Pillay Engineering College, Nagapattinam through online pedagogy from 01/11/21 to 20/11/21

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Coordinator	Coordinator	Coordinator	HoD	Principal

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Certificate ID: YAZW4U-CE000063

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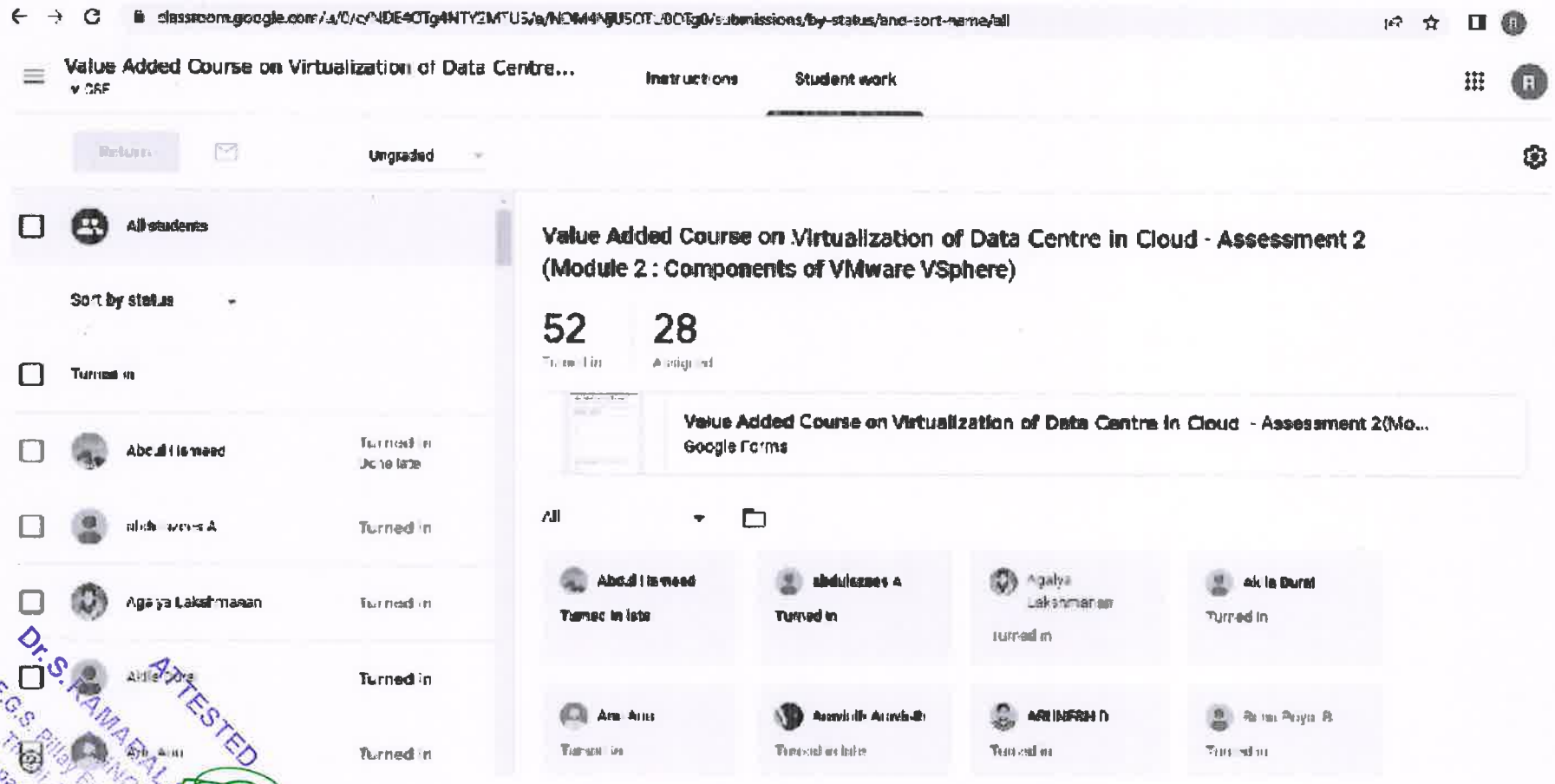
Value Added Course on Virtualization of Data Centre...
Instructions
Student work
Ungraded
All students
Sort by status
Turned in
Value Added Course on Virtualization of Data Centre in Cloud - Assessment 2
(Module 2 : Components of VMware VSphere)
52
28
Value Added Course on Virtualization of Data Centre in Cloud - Assessment 2(Mo...
Google Forms
All
Turned in
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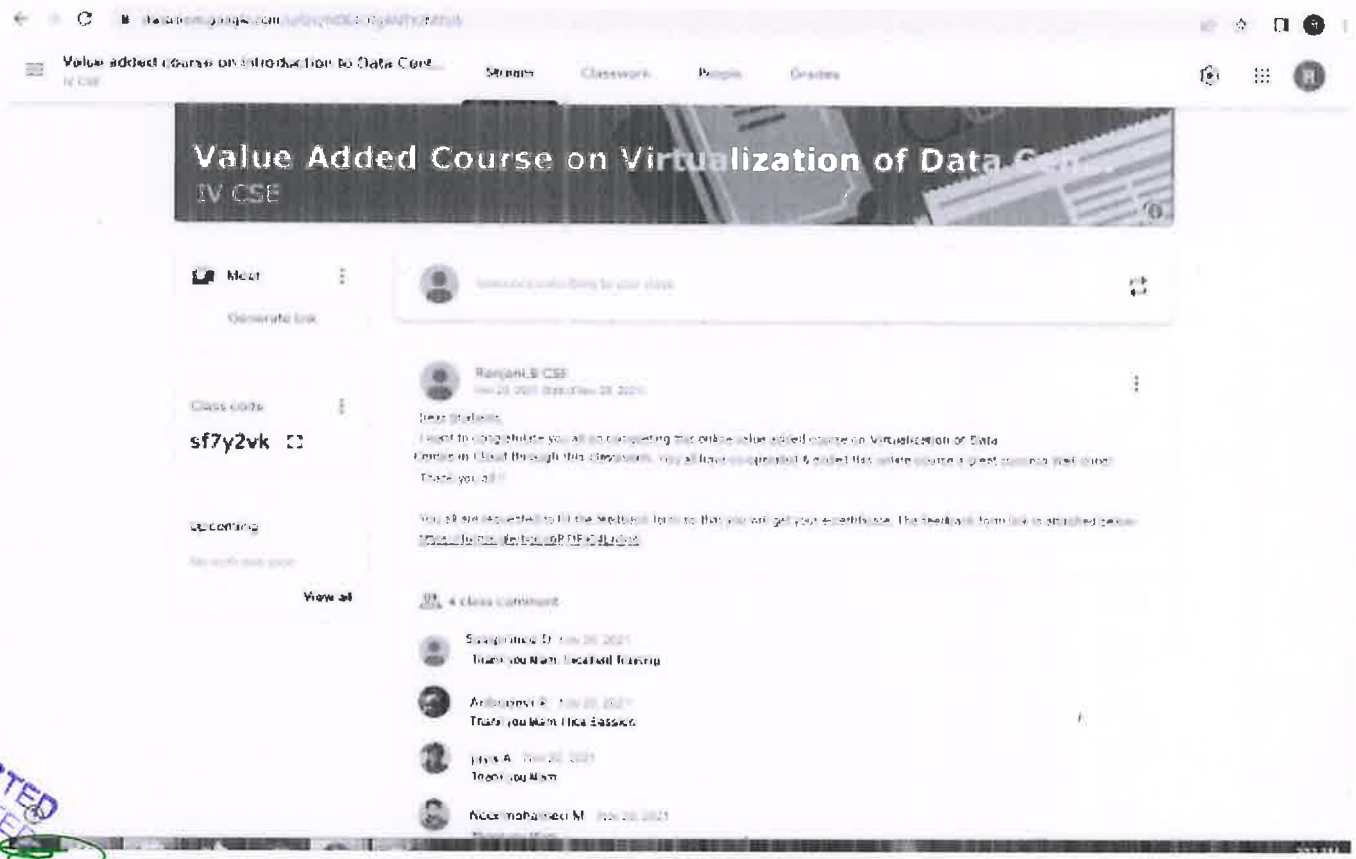

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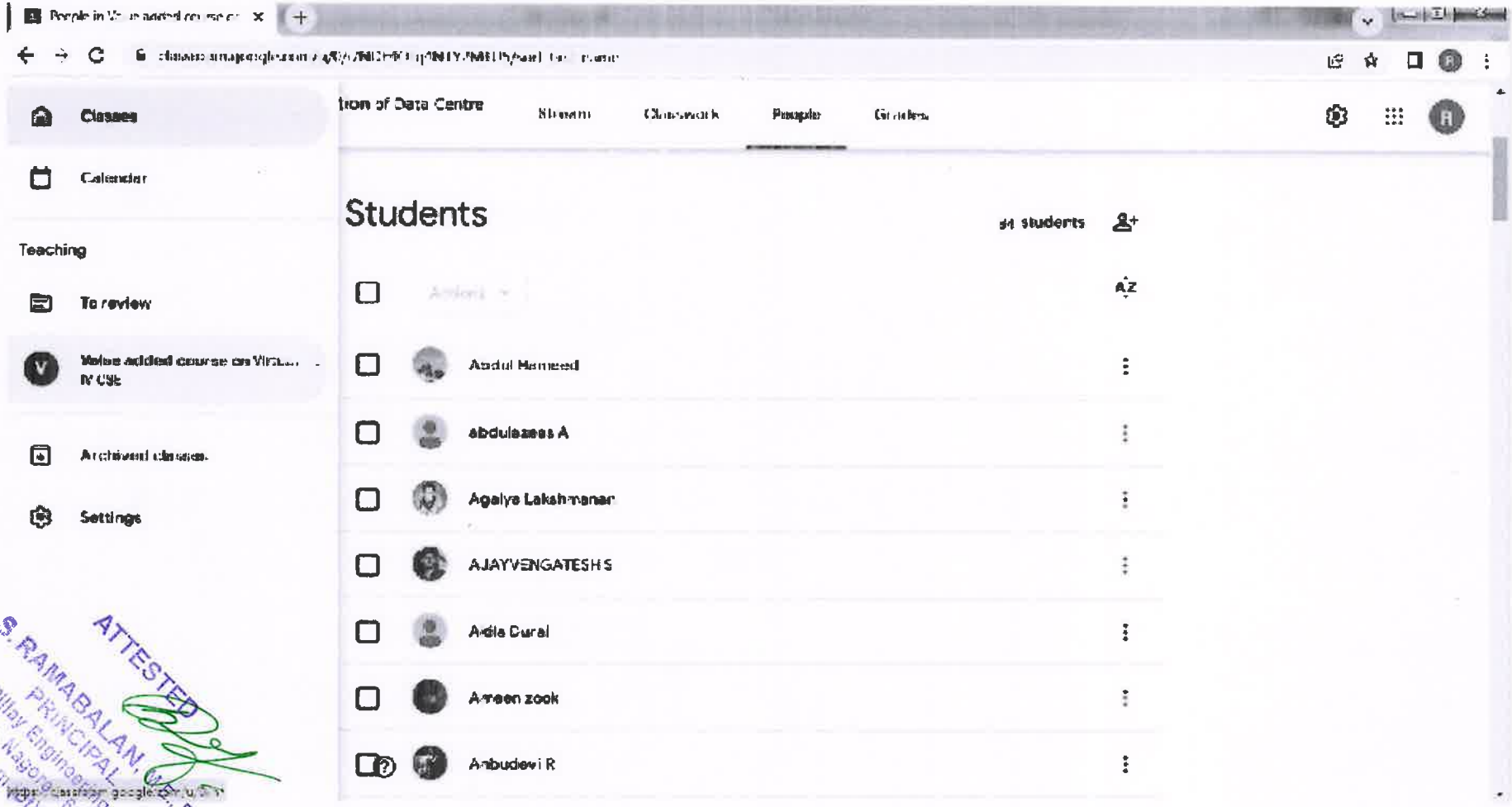

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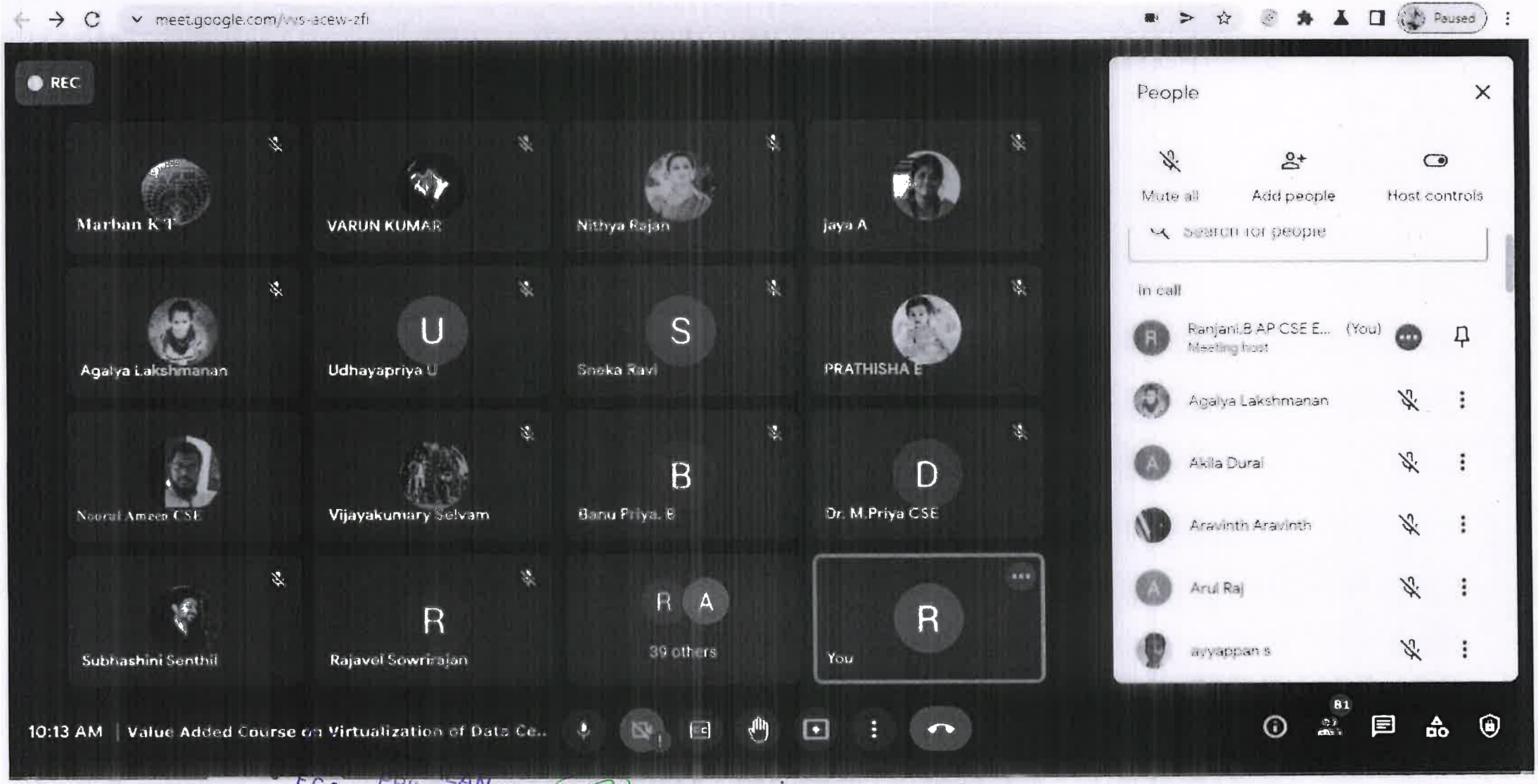

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Nagapattinam - 611 002

EGS PILLAY ENGINEERING COLLEGE-(AUTONOMOUS)

NAGAPATTINAM

Department of Computer Science and Engineering

Value Added Course

2021-2022

Title

INTRODUCTION TO R

Dates

Batch I : 11/02/22 – 17/02/22

Batch II : 18/02/22 – 24/02/22

Duration : 40 hours

Coordinators

1. Mr.G.Arulselvan, AP/CSE/EGSPEC
2. Dr.T.Ganesan, P/CSE/EGSPEC

Convener

Dr.M.Priya, Professor
Department of CSE / EGSPEC

E.G.S.PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSE
ON
INTRODUCTION TO R

TABLE OF CONTENT

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HEAD OF THE DEPARTMENT
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Nagapattinam - 611 002

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PERMISSION LETTER

Date: 07.02.2022

From

Mr.G.Arulselvan,

Assistant Professor/CSE,

Department of CSE,

E.G.S.Pillay Engineering College,

Nagapattinam.

To

The Principal,

E.G.S.Pillay Engineering College,

Nagapattinam.

Through

The Head of Department,

Department of CSE,

E.G.S.Pillay Engineering College,

Nagapattinam.

Respected Sir,

Sub: Request to conduct Value Added Course – Reg

We are happy to inform you that we have planned to organize one week value added course on title **"Introduction to R"** for III CSE Students from 11.02.22 – 17.02.22 for 1st Batch and 18.02.22 – 24.02.22 for 2nd Batch through online mode. Herewith, I have enclosed name list and session details. Kindly give permission for conducting value added course.

Thanking you,

yours truly,

[Mr.G.Arulselvan]

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CONVENER

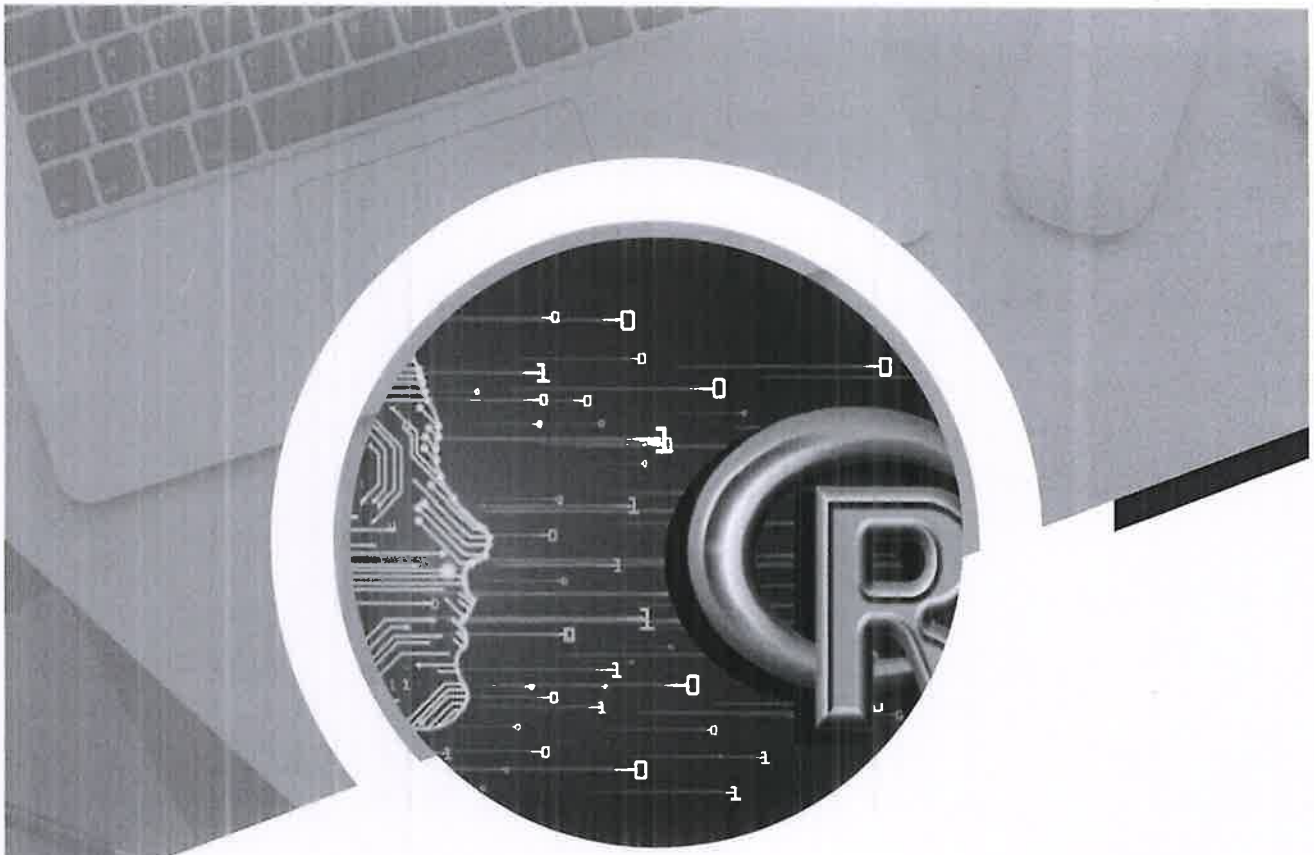
Dr.M.Priya
Professor/CSE

COORDINATORS

Dr.T.Ganesan
P/CSE
&
Mr.G.Arulselvan
AP/CSE

RESOURCE PERSON

Dr.M.Priya, P/CSE
&
Mrs.K.Kalaivani, AP/CSE



One Week Value Added Course on

INTRODUCTION TO R

Date: 11.02.22 -17.02.22

&

18.02.22 - 24.02.22

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EGSPEC/CSE/UG/VAC/2021-22/02 **Date: 09.02.2022**

CIRCULAR

It is here by informed that Department of Computer Science and Engineering is going to organize a Value Added Course on "Introduction to R" from 11.02.22 – 17.02.22 for 1st Batch and 18.02.22 – 24.02.22 for 2nd Batch through online mode by, **Dr.M.Priya, Professor** and **Mrs.K.Kalaivani, Associate Professor, Department of Computer Science and Engineering, E.G.S.Pillay Engineering College** for the benefit of III CSE Students. All the third year students are instructed to attend the course without fail.

CONVENER

HOD/CSE

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E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous) NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course on

"INTRODUCTION TO R"

PROGRAM SCHEDULE

Date: Batch I – 11/02/22 – 17/02/22

Batch II – 18/02/22 – 24/02/22

S.No	DAY	Topics
1	Day 1	R interpreter, Introduction to major R data structures like vectors, matrices, arrays, list and data frames, Control Structures, vectorized if and multiple selection, functions.
2	Day 2	Read/write data from/in files, extracting data from web-sites, Clean data, Transform data by sorting, adding/removing new/existing columns, centering, scaling and normalizing the data values, converting types of values, using string in-built functions, Statistical analysis of data for summarizing and understanding data,
3	Day 3	Visualizing data using scatter plot, line plot, bar chart, histogram and box plot.
4	Day 4	Building interactive application and connecting it with database.
5	Day 5	Using inbuilt packages for database connectivity,
6	Day 6	Building complete application with GUI and database connectivity

Session Timings:

FN: 9:00 am to 1:00 pm

AN: 2:00 pm to 5:00 pm

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SYLLABUS

VALUE ADDED COURSE ON INTRODUCTION TO R		
COURSE OBJECTIVES:		
	1. Understand the different data types & data structures in R.	
	2. Explore and understand how to use the R documentation.	
MODULE 1	**Introduction**	**10 Hours**
R interpreter, Introduction to major R data structures like vectors, matrices, arrays, list and data frames, Control Structures, vectorized if and multiple selection, functions.		
MODULE 2	**Installing, loading and using packages**	**12Hours**
Read/write data from/in files, extracting data from web-sites, Clean data, Transform data by sorting, adding/removing new/existing columns, centering, scaling and normalizing the data values, converting types of values, using string in-built functions, Statistical analysis of data for summarizing and understanding data, Visualizing data using scatter plot, line plot, bar chart, histogram and box plot.		
MODULE 3	**Designing GUI**	**10 Hours**
Building interactive application and connecting it with database.		
MODULE 4	**Building Packages**	**8 Hours**
Using inbuilt packages for database connectivity, Building complete application with GUI and database connectivity		
	Total:	**40 Hours**
COURSE OUTCOMES:		
	After completion of the course, Student will be able to	
CO1	Develop an R script and execute it.	
CO2	Install, load and deploy the required packages, and build new packages for sharing and reusability.	
CO3	Extract data from different sources using API and use it for data analysis.	
CO4	Visualize and summarize the data.	
CO5	Design application with database connectivity for data analysis.	
REFERENCES:		
1. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.0.1 (2013-05-16). URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf		
2. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013		
3. Gardener, M.(2017). Beginning R: The statistical programming language, WILEY.		

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E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course

"INTRODUCTION TO R"

ENROLLMENT LIST

S.NO	REGISTER NUMBER	NAME OF THE STUDENT	BATCH
1.	E19CSR001	AARTHI K	I
2.	E19CSR002	AASHA J	I
3.	E19CSR003	AATHIKESAVAN J	I
4.	E19CSR004	ABARNA R	I
5.	E19CSR005	ABINASH M	I
6.	E19CSR006	ABINAYA K	I
7.	E19CSR007	ABINAYA A	I
8.	E19CSR008	ABINAYA D	I
9.	E19CSR010	AJAYKUMAR K	I
10.	E19CSR011	AJISHIYA R	I
11.	E19CSR012	ANUJA N	I
12.	E19CSR013	ARCHANA .M	I
13.	E19CSR015	ARULSELVAN A	I
14.	E19CSR016	ARUNACHALAM S	I
15.	E19CSR017	ARUNPRIYA C	I
16.	E19CSR019	ASHWIN D	I
17.	E19CSR020	AYYAPPAN S	I
18.	E19CSR021	BHARATH B	I
19.	E19CSR023	BUVANA M	I
20.	E19CSR024	CHARULATHA M	I
21.	E19CSR025	DEEKSHITHA D	I
22.	E19CSR026	DHANRAJ K S	I
23.	E19CSR027	DILAWER HUSSAIN GANAI	I
24.	E19CSR028	DINESH A R	I
25.	E19CSR029	DIVYA K	I
26.	E19CSR030	DURAIVELAN P	I
27.	E19CSR032	GAYATHRI G	I
28.	E19CSR033	GOPALAKIRUSHNAN T	I
29.	E19CSR034	GURUMOORTHI M	I
30.	E19CSR035	HARIAKASH S	I
31.	E19CSR036	HARISH R	I
32.	E19CSR037	INDHUMATHI E	I
33.	E19CSR038	JAISHREE M	I
34.	E19CSR039	JALALIYA SIRAJ M	I
35.	E19CSR040	JANANI R	I
36.	E19CSR041	JAYA VARSHINI R	I
37.	E19CSR042	JEEVALAKSHMI T	I

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38.	E19CSR043	JEEVITHA PRIYA M	I
39.	E19CSR044	JENISHA J	I
40.	E19CSR045	JOTHIKA S	I
41.	E19CSR046	KABILAN K	I
42.	E19CSR047	KALAIVANI S	I
43.	E19CSR048	KARTHIK S	I
44.	E19CSR049	KARTHIK B	I
45.	E19CSR050	KATHIRAVAN M	I
46.	E19CSR051	KISHOR J R	I
47.	E19CSR052	KOKILA V	I
48.	E19CSR053	KRISHNARAJ S	I
49.	E19CSR054	KRUPASHINI S	I
50.	E19CSR055	MAGESH A	I
51.	E19CSR056	MAHALAKSHMI P	I
52.	E19CSR057	MAHALAKSHMI P R	I
53.	E19CSR058	MAHESWARAN V	I
54.	E19CSR059	MALARVIZHI A	I
55.	E19CSR060	MATHAN KUMAR M	I
56.	E19CSR061	MOHAMED AFSALUDEEN M K	I
57.	E19CSR062	MOHAMED ASMIN ALI S	I
58.	E19CSR063	MOHAMED IJAS M	I
59.	E19CSR064	MOHAMED IRFAN M	I
60.	E19CSR065	MOHAMED SAKKEEL S	I
61.	E19CSR066	MOHAMED YASEER M	I
62.	E19CSR067	MOHANRAM S	I
63.	E19CSR068	MUBENA M	I
64.	E19CSR069	MUGESHKANNA E	I
65.	E19CSR070	MUKESH K	I
66.	E19CSR071	MULLAIVENTHAN G	II
67.	E19CSR072	MUTHAMIL SELVI S	II
68.	E19CSR073	MUTHU KUMARAN D	II
69.	E19CSR074	NARESH PRASANTH U	II
70.	E19CSR075	NAVEEN KUMAR R R	II
71.	E19CSR076	NAVINKUMAR K R	II
72.	E19CSR077	NITISH SHARMA	II
73.	E19CSR078	NITHYA .C	II
74.	E19CSR079	NITHYASRI M	II
75.	E19CSR080	PAVITHRA S	II
76.	E19CSR081	PRADEEP M	II
77.	E19CSR082	PRASANTH T	II
78.	E19CSR083	PRATHEBA R	II
79.	E19CSR084	PRIYADHARSHINI V	II
80.	E19CSR085	PUNNIYAMOORTHI R	II
81.	E19CSR086	RADHAKRISHNAN B	II
82.	E19CSR087	RAMESHKANNA S	II
83.	E19CSR088	RESHMA S	II
84.	E19CSR089	ROHITH N	II
85.	E19CSR090	SAKTHI GANESH C	II

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86.	E19CSR091	SANGAVI C	II
87.	E19CSR092	SANJAY S	II
88.	E19CSR093	SANJAYNATHAN S	II
89.	E19CSR094	SANTHIYA S	II
90.	E19CSR095	SANTHOSH S	II
91.	E19CSR096	SEETHA K	II
92.	E19CSR097	SENEKA M	II
93.	E19CSR098	SHALINI M	II
94.	E19CSR099	SHANMUGASUNDARAM S	II
95.	E19CSR100	SHANTHIYA M	II
96.	E19CSR101	SIFA THAHASIN F	II
97.	E19CSR102	SINDUJA K	II
98.	E19CSR103	SINEKA S	II
99.	E19CSR104	SIVA GURU NATHAN M	II
100.	E19CSR105	SIVAGANESH S	II
101.	E19CSR106	SOWMIYA M	II
102.	E19CSR107	SOWNDHARYA S	II
103.	E19CSR108	SRIMATHI D	II
104.	E19CSR109	SUBASRI V	II
105.	E19CSR110	SURYA M	II
106.	E19CSR111	SWETHA A	II
107.	E19CSR112	SWETHA B	II
108.	E19CSR113	SWETHA S	II
109.	E19CSR114	TEJAS S	II
110.	E19CSR115	THOBIYAS A	II
111.	E19CSR116	VARSHINI K	II
112.	E19CSR117	VASANTH S	II
113.	E19CSR118	VASANTHAKUMAR S	II
114.	E19CSR119	VIGNESHWARAN .K	II
115.	E19CSR120	VIGNESHWARI V	II
116.	E19CSR121	VIJAYA N	II
117.	E19CSR122	VIJAYASARATHY R	II
118.	E19CSR123	VIKRAM M	II
119.	E19CSR124	VINODHAN G	II
120.	E19CSR125	WASIM JAFFER A	II
121.	E19CSR126	YOGA LAKSHMI B	II
122.	E19CSL301	ARAVINTH S	II
123.	E19CSL302	BASILAHAMED H	II
124.	E19CSL303	JAYASRI S	II
125.	E19CSL304	KOWTHAM P.R.M	II
126.	E19CSL305	NIVASHKANNA B	II
127.	E19CSL306	SAKTHI SRI DEVI S	II
128.	E19CSL308	VINOTHINI G	II
129.	E19CSL309	YOGESH G	II

Course Coordinator

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DATA ANALYTICS IN R

MATERIALS

Introduction:

- R is a **programming language** and software environment for **statistical analysis,graphics representation and reporting**.R was created by **Ross Ihaka** and **Robert Gentleman** at the University of Auckland, NewZealand, and is currently developed by the R Development Core Team.
- R is freely available under the GNU General Public License, and pre-compiled binary versions are provided for various operating systems like Linux, Windows and Mac.
- This programming language was named R,based on the first letter of first name of the two R authors (Robert Gentleman and Ross Ihaka),and partly a play on the name of theBell Labs Language S.
- R is the most popular data analytics tool as it is open-source, flexible, offers multiple packages and has a huge community.

Why R?

R is a programming and statistical language.

R is used for data Analysis and Visualization.

R is simple and easy to learn, read and write.

R is an example of a FLOSS (Free Libre and Open Source Software) where one can freely distribute copies of this software, read its source code, modify it, etc.

Who uses R?

- The Consumer Financial Protection Bureau uses R for data analysis
- Statisticians at John Deere use R for time series modeling and geospatial analysis in a reliable and reproducible way.
- Bank of America uses R for reporting.
- R is part of technology stack behind Foursquare's famed recommendation engine.
- ANZ, the fourth largest bank in Australia, using R for credit risk analysis.
- Google uses R to predict Economic Activity.
- Mozilla, the foundation responsible for the Firefox web browser, uses R to visualize Web activity.

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Evolution of R

- R is an implementation of S programming language which was created by John Chambers at Bell Labs.
- R was initially written by Ross Ihaka and Robert Gentleman at the Department of Statistics of the University of Auckland in Auckland, New Zealand.
- R made its first public appearance in 1993.
- A large group of individuals has contributed to R by sending code and bug reports.Since mid-1997 there has been a core group (the "R Core Team") who can modify the R source code archive.
- In the year 2000 R 1.0.0 released.
- R 3.0.0 was released in 2013.

Features of R:

- R supports procedural programming with functions and **object-oriented programming** with generic functions. Procedural programming includes procedure, records, modules, and procedure calls. While object-oriented programming language includes class, objects, and functions.
- **Packages** are part of R programming. Hence, they are useful in collecting sets of **R functions** into a single unit.
- R is a well-developed, simple and effective programming language which includes conditionals, loops, user defined recursive functions and input and output facilities.
- R has an effective data handling and storage facility,
- R provides a suite of operators for calculations on arrays, lists, vectors and matrices.
- R provides a large, coherent and integrated collection of tools for data analysis. It provides graphical facilities for data analysis and display either directly at the computer or printing at the papers.
- Rs programming features include database input, exporting data, viewing data, variable labels, missing data, etc.
- R is an interpreted language. So we can access it through command line interpreter.
- R supports **matrix** arithmetic.
- R, SAS, and SPSS are three statistical languages. Of these three statistical languages, R is the only an open source.

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The prominent editors available for R programming language are:

- **RGUI**(R graphical user interface) - Rstudio – Studio R offers a richer editing environment than RGUI and makes some common tasks easier and more fun.
- **RStudio** - RStudio is an integrated development environment (IDE) for R language. RStudio is a code editor and development environment, with some nice features that make code development in R easy and fun.
- **R Command Prompt**

Once you have R environment setup, then it's easy to start your R command prompt by just clicking on R Software icon. This will launch R interpreter and you will get a prompt > where you can start typing your programs or commands.

```
>x=6
> print(x)
```

Usually, you will do your programming by writing your programs in script files and then you execute those scripts at your command prompt with the help of R interpreter called Rscript. So let's start with writing following code in a text file called test.R as under –

```
# My first program in R Programming
myString<- "Hello, World!"
print ( myString)
```

Save the above code in a file test.R. Execute by opening that script in R editor, select all (Ctrl +A) and click on run line or selection (Ctrl+R) option in Edit menu of R console.

When we run the above program, it produces the following result.

```
[1] "Hello, World!"
```

It is **Very Important** to understand because these are the objects you will manipulate on a day-to-day basis in R. Dealing with object conversions is one of the most common sources of frustration for beginners.

To understand computations in R, two slogans are helpful:

Everything that exists is an object.
Everything that happens is a function call.

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E.G.S.Pillay Engineering College(Autonomous), Nagapattinam

Department of Computer Science and Engineering

Value Added Course Activity

Register No: E19CSR056
Name : MAHALAKSHMI P
Course Name: Introduction to R
Date: 17.02.22

Questions:

1. **Check Odd and Even Number**

```
# Program to check if the input number is odd or even.
# A number is even if division by 2 give a remainder of 0.
# If remainder is 1, it is odd.
num = as.integer(readline(prompt="Enter a number: "))
if((num %% 2) == 0) {
print(paste(num,"is Even"))
} else {
print(paste(num,"is Odd"))
}
```

Output

```
Enter a number: 89
[1] "89 is Odd"
```

2. **Find the factorial of a number**

```
# take input from the user
num = as.integer(readline(prompt="Enter a number: "))
factorial = 1
# check is the number is negative, positive or zero
if(num < 0) {
print("Sorry, factorial does not exist for negative numbers")
} else if(num == 0) {
print("The factorial of 0 is 1")
} else {
for(i in 1:num) {
factorial = factorial * i
}
print(paste("The factorial of", num ,"is",factorial))
}
```

Output

```
Enter a number: 8
[1] "The factorial of 8 is 40320"
> factorial(8)
[1] 40320
```

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3. **R Program to find the multiplicationtable (from 1 to 10)**

```
# # take input from the user
num = as.integer(readline(prompt = "Enter a number: "))
# use for loop to iterate 10 times
for(i in 1:10) {
print(paste(num,'x', i, '=', num*i))
}
```

Output

```
Enter a number: 7
[1] "7 x 1 = 7"
[1] "7 x 2 = 14"
[1] "7 x 3 = 21"
[1] "7 x 4 = 28"
....
[1] "7 x 10 = 70"
```

4. **How to display even numbers from 1 to 100 in R**

```
for (num in 1:100) {
 if (num %% 2 == 0) {
  print(paste("Even number is :", num))
 }
}
```

5. **How to check a number is a palindrome or not in R**

```
{
   n = as.integer(readline(prompt = "Enter a number :"))
    rev = 0
   num = n

   while (n > 0) {
    r = n %% 10
    rev = rev * 10 + r
    n = n %/% 10
   }
    if (rev == num)
   {
    print(paste("Number is palindrome :", rev))
   }
   else{
    print(paste("Number is not palindrome :", rev))
   }
}
```

Output:

```
Enter a number :434
[1] "Number is palindrome : 434"
```

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Department of Computer Science and Engineering

Value Added Course Activity

Register No: E19CSR124
Name : Vinothan G
Course Name: Introduction to R
Date: 24.02.22

1. **Check Leap Year**

```
# Program to check if the input year is a leap year or not
year = as.integer(readline(prompt="Enter a year: "))
if((year %% 4) == 0) {
if((year %% 100) == 0) {
if((year %% 400) == 0) {
print(paste(year,"is a leap year"))
} else {
print(paste(year,"is not a leap year"))
}
} else {
print(paste(year,"is a leap year"))
}
} else {
print(paste(year,"is not a leap year"))
}
```

2. **Fibonacci Sequence in R**

```
# Program to display the Fibonacci sequence up to n-th term using recursive functions
recurse_fibonacci <- function(n) {
if(n <= 1) {
return(n)
} else {
return(recurse_fibonacci(n-1) + recurse_fibonacci(n-2))
}
}
# take input from the user
nterms = as.integer(readline(prompt="How many terms? "))
# check if the number of terms is valid
if(nterms <= 0) {
print("Plese enter a positive integer")
} else {
print("Fibonacci sequence:")
for(i in 0:(nterms-1)) {
print(recurse_fibonacci(i))
}
}
```

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3. **R Program to Find H.C.F. or G.C.D**

```
# Program to find the H.C.F of two input number
# define a function
hcf <- function(x, y) {
# choose the smaller number
if(x > y) {
smaller = y
} else {
smaller = x
}
for(i in 1:smaller) {
if((x %% i == 0) && (y %% i == 0)) {
hcf = i
}
}
return(hcf)
}
# take input from the user
num1 = as.integer(readline(prompt = "Enter first number: "))
num2 = as.integer(readline(prompt = "Enter second number: "))
print(paste("The H.C.F. of", num1,"and", num2,"is", hcf(num1, num2)))
```

4. **Simple Calculator in R**

```
# Program make a simple calculator that can add, subtract, multiply and divide using
functions
add <- function(x, y) {
return(x + y)
}
subtract <- function(x, y) {
return(x - y)
}
multiply <- function(x, y) {
return(x * y)
}
divide <- function(x, y) {
return(x / y)
}
# take input from the user
print("Select operation.")
print("1.Add")
print("2.Subtract")
print("3.Multiply")
print("4.Divide")
choice = as.integer(readline(prompt="Enter choice[1/2/3/4]: "))
num1 = as.integer(readline(prompt="Enter first number: "))
num2 = as.integer(readline(prompt="Enter second number: "))
operator <- switch(choice,"+","-","*","/")
```

```
result <- switch(choice, add(num1, num2), subtract(num1, num2), multiply(num1, num2),
divide(num1, num2))
print(paste(num1, operator, num2, "=", result))
```

5. **Change Item values in the given list**

```
thislist <- list("apple", "banana", "cherry")
thislist[1] <- "blackcurrant"

# Print the updated list
thislist
```

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON

'INTRODUCTION TO R'

Assessment Mark Statement

S.NO	REGISTER NUMBER	NAME OF THE STUDENT	TEST MARKS (50)
1.	E19CSR001	AARTHI K	48
2.	E19CSR002	AASHA J	50
3.	E19CSR003	AATHIKESAVAN J	49
4.	E19CSR004	ABARNA R	46
5.	E19CSR005	ABINASH M	44
6.	E19CSR006	ABINAYA K	59
7.	E19CSR007	ABINAYA A	50
8.	E19CSR008	ABINAYA D	50
9.	E19CSR010	AJAYKUMAR K	47
10.	E19CSR011	AJISHIYA R	45
11.	E19CSR012	ANUJA N	50
12.	E19CSR013	ARCHANA .M	50
13.	E19CSR015	ARULSELVAN A	50
14.	E19CSR016	ARUNACHALAM S	48
15.	E19CSR017	ARUNPRIYA C	50
16.	E19CSR019	ASHWIN D	45
17.	E19CSR020	AYYAPPAN S	50
18.	E19CSR021	BHARATH B	46
19.	E19CSR023	BUVANA M	50
20.	E19CSR024	CHARULATHA M	45
21.	E19CSR025	DEEKSHITHA D	50
22.	E19CSR026	DHANRAJ K S	44
23.	E19CSR027	DILAWER HUSSAIN GANAI	47
24.	E19CSR028	DINESH A R	47
25.	E19CSR029	DIVYA K	50
26.	E19CSR030	DURAIVELAN P	40
27.	E19CSR032	GAYATHRI G	50
28.	E19CSR033	GOPALAKIRUSHNAN T	49
29.	E19CSR034	GURUMOORTHI M	48
30.	E19CSR035	HARIAKASH S	50
31.	E19CSR036	HARISH R	40
32.	E19CSR037	INDHUMATHI E	50
33.	E19CSR038	JAISHREE M	50
34.	E19CSR039	JALALIYA SIRAJ M	50
35.	E19CSR040	JANANI R	50
36.	E19CSR041	JAYA VARSHINI R	50
37.	E19CSR042	JEEVALAKSHMI T	49
38.	E19CSR043	JEEVITHA PRIYA M	50

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39.	E19CSR044	JENISHA J	45
40.	E19CSR045	JOTHIKA S	50
41.	E19CSR046	KABILAN K	50
42.	E19CSR047	KALAIVANI S	50
43.	E19CSR048	KARTHIK S	50
44.	E19CSR049	KARTHIK B	45
45.	E19CSR050	KATHIRAVAN M	50
46.	E19CSR051	KISHOR J R	50
47.	E19CSR052	KOKILA V	45
48.	E19CSR053	KRISHNARAJ S	47
49.	E19CSR054	KRUPASHINI S	45
50.	E19CSR055	MAGESH A	45
51.	E19CSR056	MAHALAKSHMI P	50
52.	E19CSR057	MAHALAKSHMI P R	50
53.	E19CSR058	MAHESWARAN V	48
54.	E19CSR059	MALARVIZHI A	45
55.	E19CSR060	MATHAN KUMAR M	50
56.	E19CSR061	MOHAMED AFSALUDEEN M K	44
57.	E19CSR062	MOHAMED ASMIN ALI S	50
58.	E19CSR063	MOHAMED IJAS M	45
59.	E19CSR064	MOHAMED IRFAN M	45
60.	E19CSR065	MOHAMED SAKKEEL S	45
61.	E19CSR066	MOHAMED YASEER M	50
62.	E19CSR067	MOHANRAM S	50
63.	E19CSR068	MUBENA M	45
64.	E19CSR069	MUGESHKANNA E	50
65.	E19CSR070	MUKESH K	45
66.	E19CSR071	MULLAIVENTHAN G	40
67.	E19CSR072	MUTHAMIL SELVI S	50
68.	E19CSR073	MUTHU KUMARAN D	50
69.	E19CSR074	NARESH PRASANTH U	50
70.	E19CSR075	NAVEEN KUMAR R R	45
71.	E19CSR076	NAVINKUMAR K R	45
72.	E19CSR077	NITISH SHARMA	45
73.	E19CSR078	NITHYA .C	50
74.	E19CSR079	NITHYASRI M	50
75.	E19CSR080	PAVITHRA S	50
76.	E19CSR081	PRADEEP M	50
77.	E19CSR082	PRASANTH T	35
78.	E19CSR083	PRATHEBA R	50
79.	E19CSR084	PRIYADHARSHINI V	50
80.	E19CSR085	PUNNIYAMOORTHI R	45
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82.	E19CSR087	RAMESHKANNA S	50
83.	E19CSR088	RESHMA S	50
84.	E19CSR089	ROHITH N	50
85.	E19CSR090	SAKTHI GANESH C	40
86.	E19CSR091	SANGAVI C	45

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87.	E19CSR092	SANJAY S	45
88.	E19CSR093	SANJAYNATHAN S	50
89.	E19CSR094	SANTHIYA S	50
90.	E19CSR095	SANTHOSH S	40
91.	E19CSR096	SEETHA K	45
92.	E19CSR097	SENEKA M	40
93.	E19CSR098	SHALINI M	40
94.	E19CSR099	SHANMUGASUNDARAM S	50
95.	E19CSR100	SHANTHIYA M	50
96.	E19CSR101	SIFA THAHASIN F	50
97.	E19CSR102	SINDUJA K	45
98.	E19CSR103	SINEKA S	45
99.	E19CSR104	SIVA GURU NATHAN M	45
100.	E19CSR105	SIVAGANESH S	50
101.	E19CSR106	SOWMIYA M	50
102.	E19CSR107	SOWNDHARYA S	45
103.	E19CSR108	SRIMATHI D	50
104.	E19CSR109	SUBASRI V	45
105.	E19CSR110	SURYA M	47
106.	E19CSR111	SWETHA A	50
107.	E19CSR112	SWETHA B	50
108.	E19CSR113	SWETHA S	50
109.	E19CSR114	TEJAS S	50
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111.	E19CSR116	VARSHINI K	45
112.	E19CSR117	VASANTH S	50
113.	E19CSR118	VASANTHAKUMAR S	45
114.	E19CSR119	VIGNESHWARAN .K	35
115.	E19CSR120	VIGNESHWARI V	35
116.	E19CSR121	VIJAYA N	45
117.	E19CSR122	VIJAYASARATHY R	50
118.	E19CSR123	VIKRAM M	50
119.	E19CSR124	VINODHAN G	45
120.	E19CSR125	WASIM JAFFER A	47
121.	E19CSR126	YOGA LAKSHMI B	45
122.	E19CSL301	ARAVINTH S	50
123.	E19CSL302	BASILAHAMED H	50
124.	E19CSL303	JAYASRI S	40
125.	E19CSL304	KOWTHAM P.R.M	50
126.	E19CSL305	NIVASHKANNA B	50
127.	E19CSL306	SAKTHI SRI DEVI S	50
128.	E19CSL308	VINOTHINI G	50
129.	E19CSL309	YOGESH G	50

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Course Coordinator

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DEPARTMENT OF CSE
E.G.S.P. Engineering College,
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E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous) – NAGAPATTINAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON

"INTRODUCTION TO R"

ASSESSMENT ANALYSIS REPORT

S.No.	Reg No	Student Name	Marks (50)
1.	E19CSR001	AARTHI K	48
2.	E19CSR002	AASHA J	50
3.	E19CSR003	AATHIKESAVAN J	49
4.	E19CSR004	ABARNA R	46
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51.	E19CSR056	MAHALAKSHMI P	50
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53.	E19CSR058	MAHESWARAN V	48
54.	E19CSR059	MALARVIZHI A	45
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117.	E19CSR122	VIJAYASARATHY R	50
118.	E19CSR123	VIKRAM M	50

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119.	E19CSR124	VINODHAN G	45
120.	E19CSR125	WASIM JAFFER A	47
121.	E19CSR126	YOGA LAKSHMI B	45
122.	E19CSL301	ARAVINTH S	50
123.	E19CSL302	BASILAHAMED H	50
124.	E19CSL303	JAYASRI S	40
125.	E19CSL304	KOWTHAM P.R.M	50
126.	E19CSL305	NIVASHKANNA B	50
127.	E19CSL306	SAKTHI SRI DEVI S	50
128.	E19CSL308	VINOTHINI G	50
129.	E19CSL309	YOGESH G	50
Total			**6099**
Attainment			**94.55814**
Level of Attainment			**3(S)**

Attainment level calculation	
>=70%-79%	1 (L)
>=80%-89%	2 (M)
>=90%	3 (S)

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Mapping of Course Outcomes Vs Program Outcomes

Comp.	Competency	Cognitive level
CO1	Develop an R script and execute it.	Apply
CO2	Install, load and deploy the required packages, and build new packages for sharing and reusability.	Understand
CO3	Extract data from different sources using API and use it for data analysis.	Analyze
CO4	Visualize and summarize the data.	Apply
CO5	Design application with database connectivity for data analysis.	Apply

CO Vs PO, PSO MAPPING

Course outcomes	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	3	-	3	3	-	-	-	-	-	-	1	-	3
CO2	2	1	3	3	3	-	-	-	-	-	-	2	-	3
CO3	2	2	-	-	2	-	-	-	-	-	-	2	-	2
CO4	-	1	-	-	2	-	-	-	-	-	-	-	-	3
CO5	3	-	2	-	2	-	-	-	-	-	-	2	-	3

1. Slight(Low) 2. Moderate(Medium) 3.Substantial(High) "-" No Correlation

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Feedback Form for Value Added Course

Register Number *

E19CSR040

Name *

JANANI R

Department *

CSE

Class *

III CSE

Name of the Course *

Introduction to R

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1.Value added course objectives were stated clearly and met *

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◉ Strongly agree

2. Value added course was well organized *

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◉ Strongly Agree

3. This Value added course increased my knowledge and skills *

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Neutral
- ◉ Agree
- ◯ Strongly Agree

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4. Coverage of syllabus was satisfied *

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ◉ Strongly Agree

Any Other Suggestions *

Need more course on recent topics

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VALUE ADDED COURSE SUMMARY REPORT

1. Title : **INTRODUCTION TO R**
2. Name of Speaker: **1. Dr.M.Priya**
   2. Mrs.K.Kalaivani
3. Speaker Details: **1. Professor, E.G.S. Pillay Engineering College**
   2. Associate Professor, E.G.S. Pillay Engineering College
2. Date of speaker's presentation: **Batch I – 11/02/22 to 17/02/22**
   Batch II – 18/02/22 to 24/02/22
3. Beneficiary Details: **III CSE STUDENTS**
4. Coordinator: **Mr.G.Arulselvan (Asst. Professor/CSE ,EGSPEC)**
   Dr.T.Ganesan (Professor/CSE, EGSPEC)

MORE ABOUT THE COURSE

R programming language is a useful tool for data scientists, analysts, and statisticians, especially those working in academic settings. R's ability to handle complex analyses such as machine learning, financial modeling, and more makes it a valuable asset for a wide range of data-related tasks.

This introduction to R course covers the basics of this open source language, including vectors, factors, lists, and data frames. Students will gain useful coding skills and be ready to start your own data analysis in R. This course get started with basic operations, like using the console as a calculator and understanding basic data types in R.

Next, students will learn how to work with matrices in R, learning how to create them, and perform calculations with them. They also examine how R uses factors to store categorical data. Finally, they will explore how to work with R data frames and lists.

This course is part of several tracks, including Data Analyst with R, Data Scientist with R, and R Programming, all of which can help you develop your knowledge.

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OLD NAGORE ROAD, THETHI, NAGAPATTINAM - 611002, TAMIL NADU, INDIA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate of Completion

This is to certify that

Anuja N

has successfully completed the online value added course on "Introduction to R" conducted by Department of Computer Science and Engineering, E.G.S. Pillay Engineering College(Autonomous), Nagapattinam from 11.02.22 to 17.02.22

COORDINATOR

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate of Completion

This is to certify that

Vijaya N

has successfully completed the online value added course on "Introduction to R" conducted by Department of Computer Science and Engineering, E.G.S. Pillay Engineering College(Autonomous), Nagapattinam from 18.02.22 to 24.02.22

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Nagapattinam (Dt.) Tamil Nadu.

E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS)
NAGAPATTINAM, TAMILNADU, INDIA – 611002

Approved by AICTE, New Delhi & Affiliated to Anna University,Chennai
An ISO 9001: 2008 Certified Institution

Department of Computer Science and Engineering

Value Added Course

2021-2022

Title

COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING

Dates

BATCH I – 11.02.22 – 17.02.22

BATCH II – 28.06.22 – 04.07.22

Duration

40 hours

Coordinator

Mr.P.Anandraj, ASP/CSE
Mrs.K.Pradeepa, AP/CSE
EGSPEC

Convener

Dr.M.Priya, Professor
Department of CSE
EGSPEC

E.G.S.PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSE
ON
COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING

TABLE OF CONTENT

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Nagapattinam (Dt) Tamil Nadu.

PERMISSION LETTER

Date: 08.02.2022

From

Mr.P.Anandraj,
Associate Professor/CSE,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

To

The Principal,
E.G.S.Pillay Engineering College,
Nagapattinam.

Through

The Head of Department,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

8/2/22

Respected Sir,

Sub: Request to conduct Value Added Course – Reg

We are happy to inform you that we have planned to organize one week value added course on title **"Comparative study of C with Python Programming"** for II CSE Students from 11.02.2022 to 17.02.2022 FOR 1ST Batch and 28.06.2022 – 04.07.2022 for 2nd Batch through online mode. Herewith, I have enclosed name list and session details. Kindly give permission for conducting value added course.

Thanking you,

yours truly,

[Mr.P.Anandraj]

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PRINCIPAL
E.G.S. Pillay Engineering College,
Nagapattinam (Dt) Tamil Nadu.

Duration
40 hours

Beneficiaries
II CSE Students

Mode:
Online

Convener

Dr.M.Priya

Professor/CSE

Coordinators

Mr.P.Anandraj

Associate Professor

CSE

&

Mrs.K.Pradeepa

Assistant Professor

CSE

Resource Person

Dr.R.Manivannan

ASP/CSE/EGSPEC

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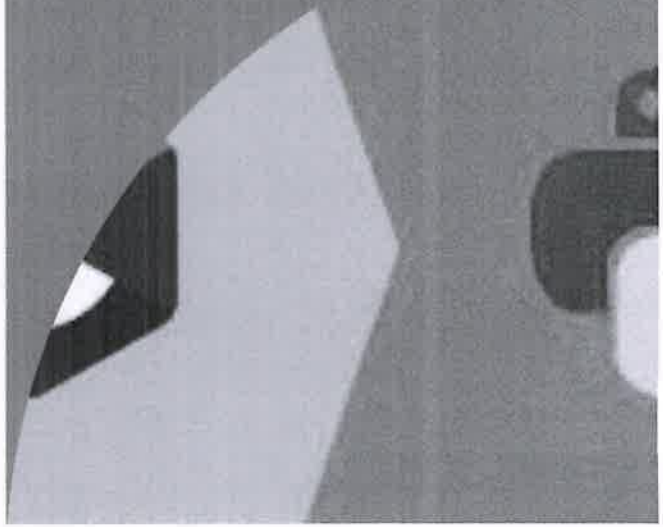
COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING

(Value AddedCourse)

Dates
11.02.22 - 17.02.22
&
28.06.22 - 04.07.22



E. G. S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EGSPEC/CSE/UG/VAC/2021-22/03 **Date: 09.02.2022**

CIRCULAR

It is here by informed that Department of Computer Science and Engineering is going to organize a Value Added Course on "**Comparative Study of C with Python Programming**" from 11.02.2022 to 17.02.2022 FOR 1ST Batch and 28.06.2022 – 04.07.2022 for 2nd Batch through online mode (9.00 am to 5.00 pm), **Dr.R.Manivannan, Associate Professor & Mr. G.Murugan, Assistant Professor, Department of Computer Science and Engineering, E.G.S.Pillay Engineering College** for the benefit of II CSE Students. All the second year students are instructed to attend the course without fail.

CONVENER

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DEPARTMENT OF CSE

Value Added Course on

"COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING"

PROGRAM SCHEDULE

Date: 1st Batch - 11.02.2022 to 17.02.2022

2nd Batch - 28.06.2022 – 04.07.2022

S.No	DAY	Topics
1	DAY 1	What is CC? What is Pyhton? Overview, Similarities & differences – Keywords & Identifiers – Variables & Constants – Input / output – operators
2	DAY 2	If-else –for –while – break & continue – switch case –Goto-Exmples – Comments
3	DAY 3	C Programming Strings , String functions -Library Functions – gets() and puts()
4	DAY 4	Functions: standard & user defined functions
5	DAY 5	File Read, File & write, Practical Session
6	DAY 6	File append-Rename , copy, delete files & Practice Session

Session Timings:

FN: 9:00 am to 1:00 pm

AN: 2:00 pm to 5:00 pm

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SYLLABUS

VALUE ADDED COURSE ON COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING		
COURSE OBJECTIVES:		
	1. To make students learn a programming language	
	2. To be able to introduce core programming basics and program design with functions	
MODULE 1	**C vs Python Introduction**	**10 Hours**
What is C. What is Pyhton? Overview, Similarities & differences – Keywords & Identifiers – Variables & Constants – Input / output – operators		
MODULE 2	**Conditional Statements, Looping, Control Statement**	**10 Hours**
If-else –for –while – break & continue – switch case –Goto- Exmples – Comments		
MODULE 3	**String Manipulation & Functions**	**10 Hours**
C Programming Strings , String functions -Library Functions – gets() and puts() Functions: standard & user defined functions -		
MODULE 4	**File Handling**	**10 Hours**
File Read, File wrie, File append-Rename , copy, delete files		
	Total:	**40 Hours**
COURSE OUTCOMES:		
	After completion of the course, Student will be able to	
CO1	Develop program in python and C language paradigms	
CO2	Understand the key concepts in the implementation of common features of programming languages	
CO3	Solve problems object oriented and logical programming paradigm	
CO4	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism	
REFERENCES:		
1. Guido van Rossum and Fred L.DrakeJr,"An Introduction to Python- Revised and updated for python 3.2,Network Theory ltd.,2011.		
2. Kernihan Brian W., " C Programming Language" , 2nd edition, Pearson publications		

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E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course

"COMPARATIVE STUDY OF C WITH PYTHON"

ENROLLMENT LIST

S.NO	REGISTER NUMBER	NAME OF THE STUDENT	BATCH
1.	E20CSR001	AAKASH A	I
2.	E20CSR002	ABINASH P	I
3.	E20CSR003	ABISHEK SINGH G	I
4.	E20CSR004	ADHITHYA M	I
5.	E20CSR005	AFZAL MUSHARRAF.M.S	I
6.	E20CSR006	AGASHINI P	I
7.	E20CSR007	AIJAY MAHESVER M	I
8.	E20CSR008	AISHWARYA U	I
9.	E20CSR009	AJAYKUMARAN V	I
10.	E20CSR010	AJINTHAN S	I
11.	E20CSR011	AKASH R	I
12.	E20CSR012	AKASH S	I
13.	E20CSR013	AKASHKUMAR S	I
14.	E20CSR014	ANILKUMAR S	I
15.	E20CSR015	ARAVINTH M	I
16.	E20CSR016	ARCHANA M	I
17.	E20CSR017	ARTHI R	I
18.	E20CSR018	ARTHI R	I
19.	E20CSR019	ARULDEVA P	I
20.	E20CSR020	ARULRAJ D	I
21.	E20CSR021	ARUNBHARATHI N	I
22.	E20CSR022	ASHWATHI C	I
23.	E20CSR023	BARANIDHARAN B	I
24.	E20CSR024	BENADIDEDISON P	I
25.	E20CSR025	BRINDHA I	I
26.	E20CSR026	CHANDRA A	I
27.	E20CSR027	DEEPAN S	I
28.	E20CSR028	DEVIBALAN B	I
29.	E20CSR029	DHARANI M	I
30.	E20CSR030	DHARSHINI K	I
31.	E20CSR031	DHARSHINI R	I
32.	E20CSR032	DINESH G	I
33.	E20CSR033	ESAI PRABHU R	I
34.	E20CSR034	ESWAR K	I
35.	E20CSR035	GAYATHIRY K	I

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36.	E20CSR036	GOKULSARAN G	I
37.	E20CSR037	GUNEHA K	I
38.	E20CSR038	HARIHARA SUDHAN G	I
39.	E20CSR039	HARIKARAN M	I
40.	E20CSR041	HARIRAJAN R	I
41.	E20CSR042	HARISH K	I
42.	E20CSR043	HARISH KANNA M	I
43.	E20CSR044	HETZYAKSHA.E	I
44.	E20CSR045	JANANI C	I
45.	E20CSR046	JAYASEELA S	I
46.	E20CSR047	JEEVA JOTHIKA B	I
47.	E20CSR048	JENITHA A	I
48.	E20CSR049	JENNODENNIS V	I
49.	E20CSR050	JOSEPH RUBEN KEVIN B	I
50.	E20CSR051	KALAIDHARANI N	I
51.	E20CSR052	KALAISELVAN R	I
52.	E20CSR053	KANIMOZHI A	I
53.	E20CSR054	KANMANI S	I
54.	E20CSR055	KARTHI K	I
55.	E20CSR056	KATHIRAVAN P	I
56.	E20CSR057	KEERTHIKA R	I
57.	E20CSR058	KIRNIKA S	I
58.	E20CSR059	KISHOR M	I
59.	E20CSR060	LALITHA N	I
60.	E20CSR061	MAAJID M	I
61.	E20CSR062	MAFROOK K	I
62.	E20CSR063	MAHALAKSHMI A	I
63.	E20CSR064	MOHAMED APSAR M	I
64.	E20CSR065	MOHAMED FAIZAL S	I
65.	E20CSR066	MOHAMED FUHADH S	I
66.	E20CSR067	MOHAMED JAVED YASAR M	I
67.	E20CSR068	MOHAMED NIZAMUDDIN N	I
68.	E20CSR069	MOHAMED SABEER N	I
69.	E20CSR070	MOHAMED THARIK M	II
70.	E20CSR071	MOHAMED YUSUF S	II
71.	E20CSR072	MOHANRAJ N	II
72.	E20CSR073	MUKESHKANNA S	II
73.	E20CSR074	MUTHUKUMARAN A	II
74.	E20CSR075	NAVINA R	II
75.	E20CSR076	NEELA N	II
76.	E20CSR077	NEPOLEON M	II
77.	E20CSR078	NIDHISH KUMAR K	II
78.	E20CSR079	NITHISH KUMAR A	II
79.	E20CSR080	NOORUL SATHIK H	II
80.	E20CSR081	PARWATHY PRIYA P	II
81.	E20CSR082	PRABAKARAN S	II
82.	E20CSR083	PRATHISHA K	II
83.	E20CSR084	PRAVEEN P	II

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84.	E20CSR085	PREETHI P	II
85.	E20CSR086	PRETHIV P	II
86.	E20CSR087	PRIYADHARSHINI K	II
87.	E20CSR088	PRIYANGA S	II
88.	E20CSR089	PUNITHAVALLI S	II
89.	E20CSR090	RABINASALINI N	II
90.	E20CSR091	RAGUL S	II
91.	E20CSR092	RAJAGURU S	II
92.	E20CSR093	RAJAVARMAN D	II
93.	E20CSR094	RAMESHWARAN T	II
94.	E20CSR095	RATHAISRI V	II
95.	E20CSR096	SAJEEVARAN S	II
96.	E20CSR097	SANDHIYA K	II
97.	E20CSR098	SANJAI S	II
98.	E20CSR099	SANTHIYA S	II
99.	E20CSR100	SANTHOSHKUMAR M	II
100.	E20CSR101	SHAMSUNDAR K	II
101.	E20CSR102	SIVARANJANI B	II
102.	E20CSR103	SOWMIYA R	II
103.	E20CSR104	SRI RAMKI R	II
104.	E20CSR105	SRIMATHI V	II
105.	E20CSR106	SRIRAM A	II
106.	E20CSR107	SRIRAM D	II
107.	E20CSR108	SRIVIDHYALAKSHMI S	II
108.	E20CSR109	SUBASRI A	II
109.	E20CSR110	SURESHGOPI C	II
110.	E20CSR111	SURUTHI M	II
111.	E20CSR112	SURYA M	II
112.	E20CSR113	SWETHA R	II
113.	E20CSR114	TAMILMANI A	II
114.	E20CSR115	THOWFIQ AZIZ H	II
115.	E20CSR116	VAISHNAVI M	II
116.	E20CSR117	VAISHNAVI S	II
117.	E20CSR118	VELKUMAR K	II
118.	E20CSR119	VENGADESH R	II
119.	E20CSR120	VIDHYA SELVI V	II
120.	E20CSR121	VIGNESH S	II
121.	E20CSR122	VIMALA M	II
122.	E20CSR123	VINOPRIYA V	II
123.	E20CSR124	VISHVA K	II
124.	E20CSR125	YUSUFF ASEHER F	II
125.	E20CSL301	ASHWATH S	II
126.	E20CSL302	GURUMOORTHI S	II
127.	E20CSL303	ISWARYA M	II
128.	E20CSL304	JEEVANESAN C	II
129.	E20CSL305	KALIYAPERUMAL K	II
130.	E20CSL306	MOHAMMED HASIM J	II
131.	E20CSL307	NARESH S	II

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Thethi Nagore - 611 002.

132.	E20CSL308	PRAVINKANTH G	II
133.	E20CSL309	PRIYADHARSHINI R	II
134.	E20CSL310	RAM PIRUTHIVI G R	II
135.	E20CSL311	SALUNKHE OM RAVINDRA	II
136.	E20CSL312	SANJAY M	II

Course Coordinator

HOD/CSE

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DEPARTMENT OF CSE
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Nagapattinam - 611 002

ATTESTED

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MATERIALS

C Language

The C programming language is a procedural and general-purpose language that provides low-level access to system memory. A program written in C must be run through a C compiler to convert it into an executable that a computer can run. Many versions of Unix-based operating systems (OSes) are written in C and it has been standardized as part of the Portable Operating System Interface (POSIX).

Today, the C programming language runs on many different hardware platforms and OSes such as Microsoft and Linux.

Pros and cons of C

The C language comes with a set of special characteristics, making it one of the most widely used languages of all time. The following are the main benefits of using C:

- Structured. It offers a structured programming approach for breaking down problems into smaller modules or functions that are easy to understand and modify.
- Portable. C is machine-independent and C programs can be executed on different machines.
- Mid-level programming language. It's a mid-level language that supports the features of both a low-level and a high-level language.
- Rich library. It offers numerous built-in library functions that expedite the development process.
- Dynamic memory allocation. C supports the dynamic memory allocation feature, which can be used to free the allocated memory at any time by calling the free() function.
- Speed. It's a compiler-based language, which makes the compilation and execution of code faster. Since only essential and required features are included in C, it saves processing power and improves speed.
- Pointers. C uses pointers, which improve performance by enabling direct interaction with the system memory.
- Recursion. C enables developers to backtrack by providing code reusability for every function.
- Extensible. A C program can be easily extended. If code is already written, new features and functionalities can be added to it with minor alterations.

C also comes with a few shortfalls, even though it's an ideal language for programming beginners due to its simple syntax, algorithms and modular structure. The following are a few disadvantages of using C:

- OOP features. C doesn't extend its support for object-oriented programming (OOP) features, which enables the creation of subclasses from parent classes. Unlike Java, Python or C++, multiple inheritances can't be created in C, which makes it difficult to reuse existing code.
- Namespace feature. C lacks namespace features, which means the same variable name can't be reused in one scope. Without namespaces, it's impossible to declare two variables with the same name.
- Run-time checking. C doesn't display code errors after each line of code; instead, all the errors are presented by the compiler after the program has been written. This can make code checking a challenge, especially for larger programs.
- Exception handling. C lacks exception handling, which is the ability to handle exceptions, such as bugs and anomalies that can happen during source code

- Constructor and destructor. Since C isn't object oriented, it doesn't offer constructor and destructor features. Constructing or destructing a variable in C must be done manually through a function or by other means.
- Garbage collection. C isn't equipped with garbage collection. This important feature automatically reclaims memory from objects that are no longer required by the library or an app.

Python

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python programs is easy: a bug or bad input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple approach very effective.

C Vs Python

C: C is a structured, mid-level, general-purpose programming language that was developed at Bell Laboratories between 1972-73 by Dennis Ritchie. It was built as a foundation for developing the UNIX operating system. Being a mid-level language, C lacks the built-in functions that are characteristic of high-level languages, but it provides all the building blocks that developers need. C follows the structure-oriented approach, that is, the top-down approach that fragments a program into smaller functions.
What makes C unique is that it is optimized for low-level memory management tasks that were previously written in Assembly language (the code follows the hexadecimal format that can directly access memory locations).This is precisely why C is used in building OS architectures. Even today, both UNIX and Linux derivatives are heavily dependent on C for many functions.

Python: Python is a general-purpose, high-level programming language that was developed by Guido Rossum in 1989. What makes Python amazing is its simple syntax that is almost similar to the English language and dynamic typing capability. The straightforward syntax allows for easy code readability.
Also, being an interpreted language, Python is an ideal language for scripting and rapid application development on most platforms and is so popular with the developers. Scripting languages incorporate both interactive and dynamic functionalities via web-based applications.

Metrices	C	Python
Introduction	C is a general-purpose, procedural computer programming language.	Python is an interpreted, high-level, general-purpose programming language.
Speed	Compiled programs execute faster as compared to interpreted programs.	Interpreted programs execute slower as compared to compiled programs.

Metrices	C	Python
Usage	Program syntax is harder than Python.	It is easier to write a code in Python as the number of lines is less comparatively.
Declaration of variables	In C, the type of a variable must be declared when it is created, and only values of that type must be assigned to it.	There is no need to declare the type of variable. Variables are untyped in Python. A given variable can be stuck on values of different types at different times during the program execution
Error Debugging	In C, error debugging is difficult as it is a compiler dependent language. This means that it takes the entire source code, compiles it and then shows all the errors.	Error debugging is simple. This means it takes only one in instruction at a time and compiles and executes simultaneously. Errors are shown instantly and the execution is stopped, at that instruction.
Function renaming mechanism	C does not support function renaming mechanism. This means the same function cannot be used by two different names.	Supports function renaming mechanism i.e, the same function can be used by two different names.
Complexity	The syntax of a C program is harder than Python.	Syntax of Python programs is easy to learn, write and read.
Memory-management	In C, the Programmer has to do memory management on their own.	Python uses an automatic garbage collector for memory management.
Applications	C is generally used for hardware related applications.	Python is a General-Purpose programming language.
Built-in functions	C has a limited number of built-in functions.	Python has a large library of built-in functions.
Implementing Data Structures	Implementing data structures requires its functions to be explicitly implemented	Gives ease of implementing data structures with built-in insert, append functions.
Pointers	Pointers are available in C.	No pointers functionality available in Python.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON "COMPARATIVE STUDY OF C WITH PYTHON"

Assessment Mark Statement

S.NO	REGISTER NUMBER	NAME OF THE STUDENT	Marks
1.	E20CSR001	AAKASH A	45
2.	E20CSR002	ABINASH P	50
3.	E20CSR003	ABISHEK SINGH G	45
4.	E20CSR004	ADHITHYA M	40
5.	E20CSR005	AFZAL MUSHARRAF.M.S	40
6.	E20CSR006	AGASHINI P	50
7.	E20CSR007	AIJAY MAHESVER M	50
8.	E20CSR008	AISHWARYA U	45
9.	E20CSR009	AJAYKUMARAN V	50
10.	E20CSR010	AJINTHAN S	45
11.	E20CSR011	AKASH R	40
12.	E20CSR012	AKASH S	45
13.	E20CSR013	AKASHKUMAR S	35
14.	E20CSR014	ANILKUMAR S	45
15.	E20CSR015	ARAVINTH M	45
16.	E20CSR016	ARCHANA M	50
17.	E20CSR017	ARTHI R	45
18.	E20CSR018	ARTHI R	45
19.	E20CSR019	ARULDEVA P	40
20.	E20CSR020	ARULRAJ D	40
21.	E20CSR021	ARUNBHARATHI N	50
22.	E20CSR022	ASHWATHI C	40
23.	E20CSR023	BARANIDHARAN B	40
24.	E20CSR024	BENADIDEDISON P	50
25.	E20CSR025	BRINDHA I	45
26.	E20CSR026	CHANDRA A	50
27.	E20CSR027	DEEPAN S	45
28.	E20CSR028	DEVIBALAN B	40
29.	E20CSR029	DHARANI M	45
30.	E20CSR030	DHARSHINI K	35
31.	E20CSR031	DHARSHINI R	45
32.	E20CSR032	DINESH G	45
33.	E20CSR033	ESAI PRABHU R	50
34.	E20CSR034	ESWAR K	40
35.	E20CSR035	GAYATHIRY K	50
36.	E20CSR036	GOKULSARAN G	40
37.	E20CSR037	GUNEHA K	40
38.	E20CSR038	HARIHARA SUDHAN G	50
39.	E20CSR039	HARIKARAN M	45
40.	E20CSR041	HARIRAJAN R	50
41.	E20CSR042	HARISH K	45

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42.	E20CSR043	HARISH KANNA M	50
43.	E20CSR044	HETZYAKSHA.E	45
44.	E20CSR045	JANANI C	40
45.	E20CSR046	JAYASEELA S	45
46.	E20CSR047	JEEVA JOTHIKA B	35
47.	E20CSR048	JENITHA A	45
48.	E20CSR049	JENNODENNIS V	45
49.	E20CSR050	JOSEPH RUBEN KEVIN B	50
50.	E20CSR051	KALAIDHARANI N	40
51.	E20CSR052	KALAISELVAN R	45
52.	E20CSR053	KANIMOZHI A	40
53.	E20CSR054	KANMANI S	40
54.	E20CSR055	KARTHI K	50
55.	E20CSR056	KATHIRAVAN P	50
56.	E20CSR057	KEERTHIKA R	45
57.	E20CSR058	KIRNIKA S	50
58.	E20CSR059	KISHOR M	45
59.	E20CSR060	LALITHA N	40
60.	E20CSR061	MAAJID M	45
61.	E20CSR062	MAFROOK K	35
62.	E20CSR063	MAHALAKSHMI A	45
63.	E20CSR064	MOHAMED APSAR M	45
64.	E20CSR065	MOHAMED FAIZAL S	50
65.	E20CSR066	MOHAMED FUHADH S	45
66.	E20CSR067	MOHAMED JAVED YASAR M	40
67.	E20CSR068	MOHAMED NIZAMUDDIN N	40
68.	E20CSR069	MOHAMED SABEER N	45
69.	E20CSR070	MOHAMED THARIK M	35
70.	E20CSR071	MOHAMED YUSUF S	45
71.	E20CSR072	MOHANRAJ N	45
72.	E20CSR073	MUKESHKANNA S	50
73.	E20CSR074	MUTHUKUMARAN A	45
74.	E20CSR075	NAVINA R	40
75.	E20CSR076	NEELA N	45
76.	E20CSR077	NEPOLEON M	35
77.	E20CSR078	NIDHISH KUMAR K	45
78.	E20CSR079	NITHISH KUMAR A	45
79.	E20CSR080	NOORUL SATHIK H	50
80.	E20CSR081	PARWATHY PRIYA P	40
81.	E20CSR082	PRABAKARAN S	50
82.	E20CSR083	PRATHISHA K	50
83.	E20CSR084	PRAVEEN P	45
84.	E20CSR085	PREETHI P	50
85.	E20CSR086	PRETHIV P	45
86.	E20CSR087	PRIYADHARSHINI K	40
87.	E20CSR088	PRIYANGA S	50
88.	E20CSR089	PUNITHAVALLI S	45
89.	E20CSR090	RABINASALINI N	40

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90.	E20CSR091	RAGUL S	40
91.	E20CSR092	RAJAGURU S	45
92.	E20CSR093	RAJAVARMAN D	35
93.	E20CSR094	RAMESHWARAN T	45
94.	E20CSR095	RATHAISRI V	45
95.	E20CSR096	SAJEEVARAN S	50
96.	E20CSR097	SANDHIYA K	45
97.	E20CSR098	SANJAI S	40
98.	E20CSR099	SANTHIYA S	45
99.	E20CSR100	SANTHOSHKUMAR M	35
100.	E20CSR101	SHAMSUNDAR K	40
101.	E20CSR102	SIVARANJANI B	50
102.	E20CSR103	SOWMIYA R	50
103.	E20CSR104	SRI RAMKI R	45
104.	E20CSR105	SRIMATHI V	50
105.	E20CSR106	SRIRAM A	45
106.	E20CSR107	SRIRAM D	40
107.	E20CSR108	SRIVIDHYALAKSHMI S	45
108.	E20CSR109	SUBASRI A	30
109.	E20CSR110	SURESHGOPI C	45
110.	E20CSR111	SURUTHI M	45
111.	E20CSR112	SURYA M	50
112.	E20CSR113	SWETHA R	45
113.	E20CSR114	TAMILMANI A	40
114.	E20CSR115	THOWFIQ AZIZ H	40
115.	E20CSR116	VAISHNAVI M	40
116.	E20CSR117	VAISHNAVI S	40
117.	E20CSR118	VELKUMAR K	45
118.	E20CSR119	VENGADESH R	35
119.	E20CSR120	VIDHYA SELVI V	40
120.	E20CSR121	VIGNESH S	50
121.	E20CSR122	VIMALA M	45
122.	E20CSR123	VINOPRIYA V	45
123.	E20CSR124	VISHVA K	50
124.	E20CSR125	YUSUFF ASEHER F	45
125.	E20CSL301	ASHWATH S	40
126.	E20CSL302	GURUMOORTHI S	35
127.	E20CSL303	ISWARYA M	40
128.	E20CSL304	JEEVANESAN C	45
129.	E20CSL305	KALIYAPERUMAL K	50
130.	E20CSL306	MOHAMMED HASIM J	50
131.	E20CSL307	NARESH S	45
132.	E20CSL308	PRAVINKANTH G	45
133.	E20CSL309	PRIYADHARSHINI R	45
134.	E20CSL310	RAM PIRUTHIVI G R	50
135.	E20CSL311	SALUNKHE OM RAVINDRA	45
136.	E20CSL312	SANJAY M	50

Course Coordinator

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HOD/CSE

E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous) – NAGAPATTINAM
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON

"COMPARATIVE STUDY OF C WITH PYTHON"

ASSESSMENT ANALYSIS REPORT

S.NO	REGISTER NUMBER	NAME OF STUDENT	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1.	E20CSR001	AAKASH A	5	5	5	5	5	5	5	5	0	5
2.	E20CSR002	ABINASH P	5	5	5	5	5	5	5	5	5	5
3.	E20CSR003	ABISHEK SINGH G	5	5	5	0	5	5	5	5	5	5
4.	E20CSR004	ADHITHYA M	0	5	5	5	5	5	5	5	5	0
5.	E20CSR005	AFZAL MUSHARRAF.M.S	5	0	5	5	5	5	5	5	0	5
6.	E20CSR006	AGASHINI P	5	5	5	5	5	5	5	5	5	5
7.	E20CSR007	AIJAY MAHESVER M	5	5	5	5	5	5	5	5	5	5
8.	E20CSR008	AISHWARYA U	5	5	5	5	5	5	5	5	5	0
9.	E20CSR009	AJAYKUMARAN V	5	5	5	5	5	5	5	5	5	5
10.	E20CSR010	AJINTHAN S	0	5	5	5	5	5	5	5	5	5
11.	E20CSR011	AKASH R	5	5	0	5	5	5	5	5	5	0
12.	E20CSR012	AKASH S	5	5	5	5	5	5	5	5	0	5
13.	E20CSR013	AKASHKUMAR S	0	5	5	5	0	5	5	5	5	0
14.	E20CSR014	ANILKUMAR S	5	5	5	5	5	0	5	5	5	5
15.	E20CSR015	ARAVINTH M	5	0	5	5	5	5	5	5	5	5
16.	E20CSR016	ARCHANA M	5	5	5	5	5	5	5	5	5	5
17.	E20CSR017	ARTHI R	5	5	5	5	5	5	5	5	5	0
18.	E20CSR018	ARTHI R	5	5	0	5	5	5	5	5	5	5
19.	E20CSR019	ARULDEVA P	5	5	5	0	5	5	0	5	5	5
20.	E20CSR020	ARULRAJ D	0	0	5	5	5	5	5	5	5	5
21.	E20CSR021	ARUNBHARATHI N	5	5	5	5	5	5	5	5	5	5
22.	E20CSR022	ASHWATHI C	5	5	5	5	0	5	5	5	5	0
23.	E20CSR023	BARANIDHARAN B	0	5	5	0	5	5	5	5	5	5
24.	E20CSR024	BENADIDEDISON P	5	5	5	5	5	5	5	5	5	5
25.	E20CSR025	BRINDHA I	5	5	5	5	5	5	5	5	5	0
26.	E20CSR026	CHANDRA A	5	5	5	5	5	5	5	5	5	5
27.	E20CSR027	DEEPAN S	0	5	5	5	5	5	5	5	5	5
28.	E20CSR028	DEVIBALAN B	5	5	0	5	5	5	5	5	5	0
29.	E20CSR029	DHARANI M	5	5	5	5	5	5	5	5	0	5
30.	E20CSR030	DHARSHINI K	0	5	5	5	0	5	5	5	5	0
31.	E20CSR031	DHARSHINI R	5	5	5	5	5	0	5	5	5	5
32.	E20CSR032	DINESH G	5	0	5	5	5	5	5	5	5	5
33.	E20CSR033	ESAI PRABHU R	5	5	5	5	5	5	5	5	5	5
34.	E20CSR034	ESWAR K	0	0	5	5	5	5	5	5	5	5
35.	E20CSR035	GAYATHIRY K	5	5	5	5	5	5	5	5	5	5
36.	E20CSR036	GOKULSARAN G	5	5	5	5	0	5	5	5	5	0
37.	E20CSR037	GUNEHA K	0	5	5	0	5	5	5	5	5	5
38.	E20CSR038	HARIHARA SUDHAN G	5	5	5	5	5	5	5	5	5	5
39.	E20CSR039	HARIKARAN M	5	5	5	5	5	5	5	5	5	0
40.	E20CSR041	HARIRAJAN R	5	5	5	5	5	5	5	5	5	5
41.	E20CSR042	HARISH K	5	5	5	5	5	5	5	5	5	0
42.	E20CSR043	HARISH KANNA M	5	5	5	5	5	5	5	5	5	5
43.	E20CSR044	HETZYAKSHA.E	0	5	5	5	5	5	5	5	5	5
44.	E20CSR045	JANANI C	5	5	0	5	5	5	5	5	5	0
45.	E20CSR046	JAYASEELA S	5	5	5	5	5	5	5	5	0	5
46.	E20CSR047	JEEVA JOTHIKA B	0	5	5	5	0	5	5	5	5	0
47.	E20CSR048	JENITHA A	5	5	5	5	5	0	5	5	5	5
48.	E20CSR049	JENNODENNIS V	5	0	5	5	5	5	5	5	5	5
49.	E20CSR050	JOSEPH RUBEN KEVIN B	5	5	5	5	5	5	5	5	5	5
50.	E20CSR051	KALAIDHARANI N	0	0	5	5	5	5	5	5	5	5
51.	E20CSR052	KALAISELVAN R	5	5	5	0	5	5	5	5	5	5

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52.	E20CSR053	KANIMOZHI A	0	5	5	5	5	5	5	5	5	0
53.	E20CSR054	KANMANI S	5	0	5	5	5	5	5	5	0	5
54.	E20CSR055	KARTHI K	5	5	5	5	5	5	5	5	5	5
55.	E20CSR056	KATHIRAVAN P	5	5	5	5	5	5	5	5	5	5
56.	E20CSR057	KEERTHIKA R	5	5	5	5	5	5	5	5	5	0
57.	E20CSR058	KIRNIKA S	5	5	5	5	5	5	5	5	5	5
58.	E20CSR059	KISHOR M	0	5	5	5	5	5	5	5	5	5
59.	E20CSR060	LALITHA N	5	5	0	5	5	5	5	5	5	0
60.	E20CSR061	MAAJID M	5	5	5	5	5	5	5	5	0	5
61.	E20CSR062	MAFROOK K	0	5	5	5	0	5	5	5	5	0
62.	E20CSR063	MAHALAKSHMI A	5	5	5	5	5	0	5	5	5	5
63.	E20CSR064	MOHAMED APSAR M	5	0	5	5	5	5	5	5	5	5
64.	E20CSR065	MOHAMED FAIZAL S	5	5	5	5	5	5	5	5	5	5
65.	E20CSR066	MOHAMED FUHADH S	5	5	5	5	5	5	5	5	5	0
66.	E20CSR067	MOHAMED JAVED YASAR M	0	5	0	5	5	5	5	5	5	5
67.	E20CSR068	MOHAMED NIZAMUDDIN N	5	5	0	5	5	5	5	5	5	0
68.	E20CSR069	MOHAMED SABEER N	5	5	5	5	5	5	5	5	0	5
69.	E20CSR070	MOHAMED THARIK M	0	5	5	5	0	5	5	5	5	0
70.	E20CSR071	MOHAMED YUSUF S	5	5	5	5	5	0	5	5	5	5
71.	E20CSR072	MOHANRAJ N	5	0	5	5	5	5	5	5	5	5
72.	E20CSR073	MUKESHKANNA S	5	5	5	5	5	5	5	5	5	5
73.	E20CSR074	MUTHUKUMARAN A	0	5	5	5	5	5	5	5	5	5
74.	E20CSR075	NAVINA R	5	5	0	5	5	5	5	5	5	0
75.	E20CSR076	NEELA N	5	5	5	5	5	5	5	5	0	5
76.	E20CSR077	NEPOLEON M	0	5	5	5	0	5	5	5	5	0
77.	E20CSR078	NIDHISH KUMAR K	5	5	5	5	5	0	5	5	5	5
78.	E20CSR079	NITHISH KUMAR A	5	0	5	5	5	5	5	5	5	5
79.	E20CSR080	NOORUL SATHIK H	5	5	5	5	5	5	5	5	5	5
80.	E20CSR081	PARWATHY PRIYA P	5	0	5	5	5	5	5	5	0	5
81.	E20CSR082	PRABAKARAN S	5	5	5	5	5	5	5	5	5	5
82.	E20CSR083	PRATHISHA K	5	5	5	5	5	5	5	5	5	5
83.	E20CSR084	PRAVEEN P	5	5	5	5	5	5	5	5	5	0
84.	E20CSR085	PREETHI P	5	5	5	5	5	5	5	5	5	5
85.	E20CSR086	PRETHIV P	0	5	5	5	5	5	5	5	5	5
86.	E20CSR087	PRIYADHARSHINI K	5	5	0	5	5	5	5	5	5	0
87.	E20CSR088	PRIYANGA S	5	5	5	5	5	5	5	5	5	5
88.	E20CSR089	PUNITHAVALLI S	5	5	5	5	5	5	5	5	5	0
89.	E20CSR090	RABINASALINI N	0	5	0	5	5	5	5	5	5	5
90.	E20CSR091	RAGUL S	5	5	0	5	5	5	5	5	5	0
91.	E20CSR092	RAJAGURU S	5	5	5	5	5	5	5	5	0	5
92.	E20CSR093	RAJAVARMAN D	0	5	5	5	0	5	5	5	5	0
93.	E20CSR094	RAMESHWARAN T	5	5	5	5	5	0	5	5	5	5
94.	E20CSR095	RATHAISRI V	5	0	5	5	5	5	5	5	5	5
95.	E20CSR096	SAJEEVARAN S	5	5	5	5	5	5	5	5	5	5
96.	E20CSR097	SANDHIYA K	0	5	5	5	5	5	5	5	5	5
97.	E20CSR098	SANJAI S	5	5	0	5	5	5	5	5	5	0
98.	E20CSR099	SANTHIYA S	5	5	5	5	5	5	5	5	0	5
99.	E20CSR100	SANTHOSHKUMAR M	0	5	5	5	0	5	5	5	5	0
100.	E20CSR101	SHAMSUNDAR K	5	0	5	5	5	5	5	5	0	5
101.	E20CSR102	SIVARANJANI B	5	5	5	5	5	5	5	5	5	5
102.	E20CSR103	SOWMIYA R	5	5	5	5	5	5	5	5	5	5
103.	E20CSR104	SRI RAMKI R	5	5	5	5	5	5	5	5	5	0
104.	E20CSR105	SRIMATHI V	5	5	5	5	5	5	5	5	5	5
105.	E20CSR106	SRIRAM A	0	5	5	5	5	5	5	5	5	5
106.	E20CSR107	SRIRAM D	5	5	0	5	5	5	5	5	5	0
107.	E20CSR108	SRIVIDHYALAKSHMI S	5	5	5	5	5	5	5	5	0	5
108.	E20CSR109	SUBASRI A	0	5	5	5	0	0	5	5	5	0
109.	E20CSR110	SURESHGOPI C	5	5	5	5	5	0	5	5	5	5
110.	E20CSR111	SURUTHI M	5	0	5	5	5	5	5	5	5	5
111.	E20CSR112	SURYA M	5	5	5	5	5	5	5	5	5	5
112.	E20CSR113	SWETHA R	5	5	5	5	5	5	5	5	5	0
113.	E20CSR114	TAMILMANI A	0	5	0	5	5	5	5	5	5	5
114.	E20CSR115	THOWFIQ AZIZ H	5	5	0	5	5	5	5	5	5	0
115.	E20CSR116	VAISHNAVI M	0	5	5	5	5	5	5	5	5	5

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116.	E20CSR117	VAISHNAVI S	5	5	0	5	5	5	5	5	5	0
117.	E20CSR118	VELKUMAR K	5	5	5	5	5	5	5	5	0	5
118.	E20CSR119	VENGADESH R	0	5	5	5	0	5	5	5	5	0
119.	E20CSR120	VIDHYA SELVI V	5	0	5	5	5	5	5	5	0	5
120.	E20CSR121	VIGNESH S	5	5	5	5	5	5	5	5	5	5
121.	E20CSR122	VIMALA M	5	5	5	5	5	0	5	5	5	5
122.	E20CSR123	VINOPRIYA V	5	5	5	5	5	5	5	5	5	0
123.	E20CSR124	VISHVA K	5	5	5	5	5	5	5	5	5	5
124.	E20CSR125	YUSUFF ASEHER F	0	5	5	5	5	5	5	5	5	5
125.	E20CSL301	ASHWATH S	5	5	0	5	5	5	5	5	5	0
126.	E20CSL302	GURUMOORTHI S	0	5	5	5	0	5	5	5	5	0
127.	E20CSL303	ISWARYA M	5	0	5	5	5	5	5	5	0	5
128.	E20CSL304	JEEVANESAN C	5	5	5	5	5	0	5	5	5	5
129.	E20CSL305	KALIYAPERUMAL K	5	5	5	5	5	5	5	5	5	5
130.	E20CSL306	MOHAMMED HASIM J	5	5	5	5	5	5	5	5	5	5
131.	E20CSL307	NARESH S	5	5	5	5	5	0	5	5	5	5
132.	E20CSL308	PRAVINKANTH G	0	5	5	5	5	5	5	5	5	5
133.	E20CSL309	PRIYADHARSHINI R	5	5	5	5	5	0	5	5	5	5
134.	E20CSL310	RAM PIRUTHIVI G R	5	5	5	5	5	5	5	5	5	5
135.	E20CSL311	SALUNKHE OM RAVINDRA	0	5	5	5	5	5	5	5	5	5
136.	E20CSL312	SANJAY M	5	5	5	5	5	5	5	5	5	5
	Total		**515**	**595**	**595**	**655**	**615**	**610**	**675**	**680**	**595**	**480**
	Attainment		**75.7**	**87.5**	**87.5**	**96.3**	**90.4**	**89.7**	**99.3**	**100.0**	**87.5**	**70.6**
	Level of Attainment		**1(L)**	**2(M)**	**2(M)**	**3(S)**	**3(S)**	**2(M)**	**3(S)**	**3(S)**	**2(M)**	**2(M)**

Attainment level calculation	
>=70%-79%	1 (L)
>=80%-89%	2 (M)
>=90%	3 (S)

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Mapping of Course Outcomes Vs Program Outcomes

Comp.	Competency	Cognitive level
CO1	Develop program in python and C language paradigms	Apply
CO2	Understand the key concepts in the implementation of common features of programming languages	Understand
CO3	Solve problems object oriented and logical programming paradigm	Understand
CO4	Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism	Apply
CO5	Develop program in python and C language paradigms	Analyze

CO Vs PO, PSO MAPPING

Course outcomes	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	3	-	3	3	-	-	-	-	-	-	1	-	3
CO2	2	1	3	3	3	-	-	-	-	-	-	2	-	3
CO3	2	2	-	-	2	-	-	-	-	-	-	2	-	2
CO4	-	1	-	-	2	-	-	-	-	-	-	-	-	3
CO5	3	-	2	-	2	-	-	-	-	-	-	2	-	3

1. Slight(Low) 2. Moderate(Medium) 3.Substantial(High) "-" No Correlation

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Thethi, Nagore - 611 002.
Nagapattinam (Dt) Tamil Nadu.

VALUE ADDED COURSE SUMMARY REPORT

1. Title : **COMPARATIVE STUDY OF C WITH PYTHON PROGRAMMING**
2. Name of Speaker: **Dr.R.Manivannan**
3. Speaker Details: **ASSOCIATE PROFESSOR, E.G.S. PILLAY ENGINEERING COLLEGE**
4. Date of speaker's presentation: **FROM 11/02/22 - 17/02/22 & 18/06/22 - 04/07/22**
5. Beneficiary Details: **II CSE STUDENTS**
6. Coordinator: **Dr.P.Anandraj (ASSO. PROFESSOR/CSE ,EGSPEC)**
   Mrs.P.Vennila (Asst.Prof/CSE/EGSPEC)

More about this course

This course gives a comparative study of programming languages C and Python which makes the students to lean and develop the programming skills effectively in an efficient manner. Students felt that this course was very useful and helpful for them to understand programming languages in depth.

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E.G.S.PILLAY ENGINEERING COLLEGE
(AUTONOMOUS)

(APPROVED BY AICTE, NEW DELHI & AFFILIATED TO ANNA UNIVERSITY, CHENNAI)
(ACCREDITED BY NAAC WITH 'A' GRADE & NBA)
OLD NAGORE ROAD, THETHI, NAGAPATTINAM - 611002, TAMIL NADU, INDIA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate of Completion

This certificate is presented to

Janani C

has successfully completed the online value added course on "Comparative Study of C with Python Programming" conducted by Department of Computer Science and Engineering, E.G.S. Pillay Engineering College(Autonomous), Nagapattinam from 11.02.22 to 17.02.22

ATTESTED
Dr.S.RAMABALAN, M.E., Ph.D.,
PRINCIPAL
E.G.S. Pillay Engineering College,
Thethi, 611 002.
Nagapattinam Dt.

COORDINATORS | HOD/CSE | PRINCIPAL

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OLD NAGORE ROAD, THETHI, NAGAPATTINAM - 611002, TAMIL NADU, INDIA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate of Completion

This certificate is presented to

Santhiya S

has successfully completed the online value added course on "Comparative Study of C with Python Programming" conducted by Department of Computer Science and Engineering, E.G.S. Pillay Engineering College(Autonomous), Nagapattinam from 28.06.22 to 04.07.22

ATTESTED
Dr.S.RAMABALAN, M.E., Ph.D.,
PRINCIPAL

COORDINATORS | HOD/CSE | PRINCIPAL

EGS PILLAY ENGINEERING COLLEGE-(AUTONOMOUS)

NAGAPATTINAM

Department of Computer Science and Engineering

Value Added Course

2021-2022

Title

DATA ANALYTICS IN R

Duration

04/04/2022 - 09/04/2022

40 hours

Coordinator	Convener
Dr. M. Priya Professor Department of CSE EGSPEC	Dr.M.Chinnadurai Professor & HOD Department of CSE EGSPEC

E.G.S.PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSE
ON
DATA ANALYTICS IN R

TABLE OF CONTENT

HEAD OF THE DEPARTMENT
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Nagapattinam (Dt) Tamil Nadu.

PERMISSION LETTER

Date: 28.03.2022

From

Dr. M. Priya,
Professor/CSE,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

To

The Principal,
E.G.S.Pillay Engineering College,
Nagapattinam.

Through

The Head of Department,
Department of CSE,
E.G.S.Pillay Engineering College,
Nagapattinam.

Respected Sir,

Sub: Request to conduct Value Added Course – Reg

We are happy to inform you that we have planned to organize one week value added course on title **"Data Analytics in R"** for PG CSE Students from 04.04.2022 to 09.04.2022 through online mode. Herewith, I have enclosed name list and session details. Kindly give permission for conducting value added course.

Thanking you,

yours truly,

[Dr.M.Priya]

HEAD OF THE DEPARTMENT
DEPARTMENT OF CSE
E.G.S. Pillay Engineering College
Nagapattinam - 611 002

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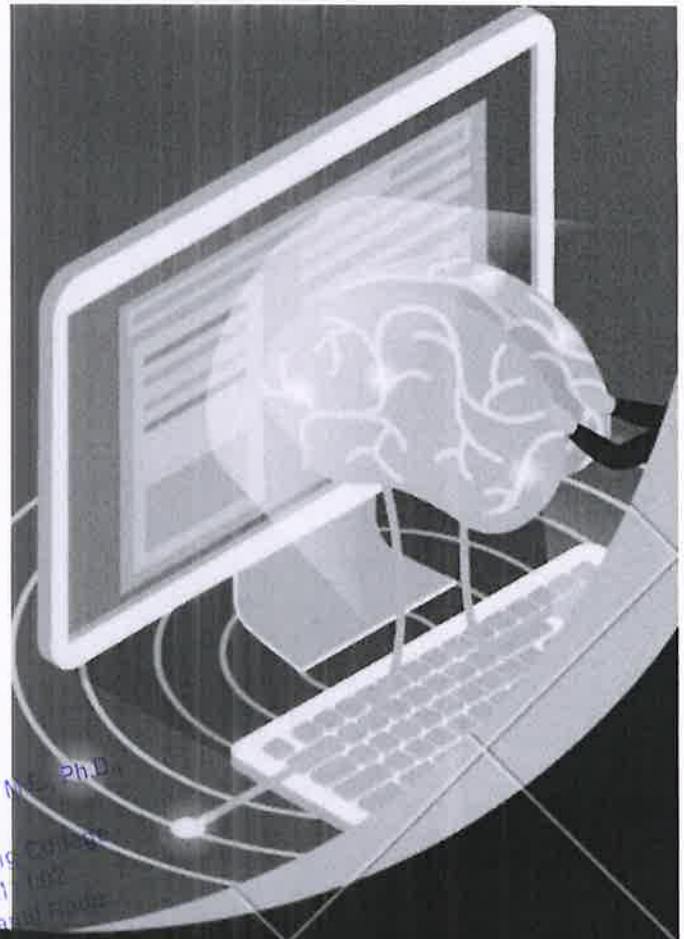
Nagapattinam (Dt) Tamil Nadu.

Topics include:

1. Introduction to Data Analysis
2. R Programming Basics
3. Data Visualization using R
4. Statistics with R
5. Prescriptive Analytics



ATTESTED

Dr. S. RAMABALAN, M.E., Ph.D.
PRINCIPAL
Bannari Amman Institute of Technology
Sathyamangalam - 638 401
Erode District, Tamil Nadu

Date:
04.04.22 - 09.04.22

Organized by

Department of Computer Science and Engineering

6Days Value Added Course on Data Analytics in R

Venue
Online Platform

Contact

www.egspec.org

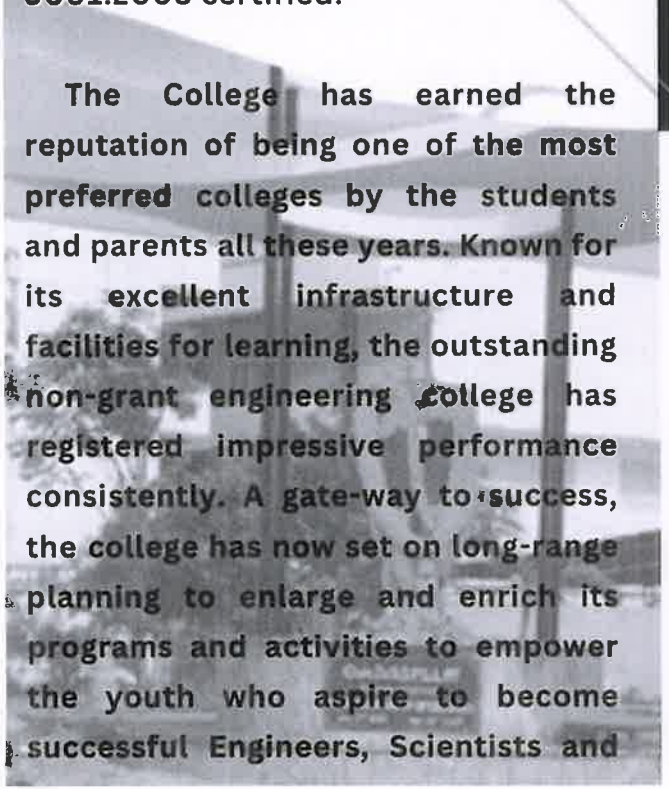
+91-4365-251112 | +91-4365-251114

Certificate will be issued to all participants on successful completion of this course

ABOUT THE COLLEGE

EGS Pillay Engineering College was started in the year 1995 under the sponsorship of G. S. Pillay & Sons Educational and Charitable Trust. College has gained the reputation of being most preferred engineering college by the students. College is approved by the AICTE, New Delhi and is affiliated to Anna University from 2002 and the degrees are awarded by Anna University, as per the Government Orders. It is ISO 9001:2008 certified.

The College has earned the reputation of being one of the most preferred colleges by the students and parents all these years. Known for its excellent infrastructure and facilities for learning, the outstanding non-grant engineering college has registered impressive performance consistently. A gate-way to success, the college has now set on long-range planning to enlarge and enrich its programs and activities to empower the youth who aspire to become successful Engineers, Scientists and



Our Vision & Mission

Vision of the Department

To produce globally competent computer professionals capable of adapting to the ever-changing technological trends of Industry and Society.

Mission of the Department

1.To build the core competence desirable for a computer professional such as design, development, testing and maintenance of software systems to work on real world projects and meet the expected standards of Industries.

2.To train the students to acquire higher order skills of emerging technologies to make them preferable for employers.

3.To provide state-of-the-art learning facilities for effective implementation of learner centric teaching-learning process to develop professional skills, self-learning and lifelong learning capabilities.

ABOUT THE DEPARTMENT

Department of Computer Science and Engineering programme was introduced at Edayathangudy G.S.Pillay Engineering College in the Academic Year 1995-1996. The demand for Computer Engineers in software companies, banking sectors and private sectors engaged in developing new trends of software generation is more than the engineers available.

The department has Recognized Research Centre for doing PhD / M.S. (By Research), obtained Permanent Affiliation from Anna University in the year 2014-15. The department has formed student association namely Computer Engineers Association (CEA) to promote talent of the students and their upliftment. The department has highly qualified and experienced faculties. The department has well experienced faculties in the research and more number of publications in reputed Journals and Conferences.

The department has well infrastructural facilities. From 2011 onwards every year, we are conducting International and National conferences. The B.E (CSE) programme was accredited by NBA in the year 2016 and reaccredited in the year 2019 for next three years.

Convenor:

Prof.Dr.M.CHINNADURAI
Professor & Head
CSE

Course Coordinator:

Dr.M.Priya
ProfessorCSE

Resource Person:

Mr.P.Anandraj
Associate Professor
CSE

Beneficiaries:

PG CSE Students

ATTESTED
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Thethi, Nagore - 611 002.
Nagapattinam Dt, Tamil Nadu.

Course Duration :40 Hours

E. G. S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EGSPEC/CSE/PG/VAC/2021-22/01 **Date: 30.03.2022**

CIRCULAR

It is here by informed that Department of Computer Science and Engineering is going to organize a Value Added Course on "Data Analytics in R" from 04.04.2022 to 09.04.2022 through online mode (9.00 am to 5.00 pm) by, **Mr.P.Anandraj, Associate Professor, Department of Computer Science and Engineering, E.G.S.Pillay Engineering College** for the benefit of PG CSE Students. All the PG final year students are instructed to attend the course without fail.

CONVENER

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E.G.S. PILLAY ENGINEERING COLLEGE (Autonomous) NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course on

"DATA ANALYTICS IN R"

PROGRAM SCHEDULE

Date: 04.04.2022 – 09.04.2022

S.No	DATE	Topics
1	04/04/22	Overview of Data Analytics, Need of Data Analytics, Nature of Data, Classification of Data: Structured, Semi-Structured, Unstructured, Characteristics of Data, Applications of Data Analytics.
2	05/04/22	Overview of R programming, Environment setup with R Studio, R Commands, Variables and Data Types, Control Structures, Array, Matrix, Vectors, Factors, Functions, R packages.
3	06/04/22	Reading and getting data into R (External Data): Using CSV files, XML files, Web Data, JSON files, Databases, Excel files.
4	07/04/22	Working with R Charts and Graphs: Histograms,Boxplots,Bar Charts, Line Graphs, Scatterplots, Pie Charts
5	08/04/22	Random Forest. Decision Tree. Normal and Binomial distributions,Time Series Analysis,Linear and Multiple Regression, Logistic Regression, Survival Analysis
6	09/04/22	Creating data for analytics through designed experiments, Creating data for analytics through active learning, Creating data for analytics through reinforcement learning

Session Timings:

FN: 9:00 am to 1:00 pm

AN: 2:00 pm to 5:00 pm

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SYLLABUS

VALUE ADDED COURSE ON DATA ANALYTICS IN R		
COURSE OBJECTIVES:		
	1. Make students exercise the fundamentals of statistical analysis in R environment	
	2. Provides what data are, how they are collected, the role of metadata in understanding a given set of data, and how to assess the quality	
MODULE 1	**Introduction to Data Analysis**	**8 Hours**
Overview of Data Analytics, Need of Data Analytics, Nature of Data, Classification of Data: Structured, Semi-Structured, Unstructured, Characteristics of Data, Applications of Data Analytics.		
MODULE 2	**R Programming Basics**	**8 Hours**
Overview of R programming, Environment setup with R Studio, R Commands, Variables and Data Types, Control Structures, Array, Matrix, Vectors, Factors, Functions, R packages.		
MODULE 3	**Data Visualization using R**	**8 Hours**
Reading and getting data into R (External Data): Using CSV files, XML files, Web Data, JSON files, Databases, Excel files. Working with R Charts and Graphs: Histograms,Boxplots,Bar Charts, Line Graphs, Scatterplots, Pie Charts		
MODULE 4	**Statistics with R**	**8 Hours**
Random Forest, Decision Tree, Normal and Binomial distributions,Time Series Analysis,Linear and Multiple Regression, Logistic Regression, Survival Analysis		
MODULE 5	**Prescriptive Analytics**	**8 Hours**
Creating data for analytics through designed experiments, Creating data for analytics through active learning, Creating data for analytics through reinforcement learning		
	Total:	**40 Hours**
COURSE OUTCOMES:		
	After completion of the course, Student will be able to	
CO1	Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames.	
CO2	Describe key terminologies, concepts and techniques employed in Statistical Analysis.	
CO3	Understand the fundamental concepts of Data Science	
CO4	Apply statistical techniques using R Programming for data analytics and decision making.	
CO5	Provides solutions to businesses worldwide with the advanced analysis techniques and tools.	
REFERENCES:		
1. An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.0.1 (2013-05-16). URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf		
2. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013		

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E.G.S. PILLAY ENGINEERING COLLEGE (AUTONOMOUS), NAGAPATTINAM

DEPARTMENT OF CSE

Value Added Course

"DATA ANAYTICS IN R"

ENROLLMENT LIST

S.NO	REGISTER NUMBER	NAME OF THE STUDENT
1.	E20CPF001	Abinaya M.D
2.	E20CPF002	Abinaya G
3.	E20CPF003	Ajeetha G
4.	E20CPF004	Akalya S
5.	E20CPF005	Bharathidhasan A
6.	E20CPF006	Jayasri S
7.	E20CPF007	Kayalvizhi R
8.	E20CPF008	Mahesh A
9.	E20CPF009	Nivedha K
10.	E20CPF010	Pragathi J
11.	E20CPF011	Preethi K
12.	E20CPF012	Sowndharya B
13.	8208E21CPF001	Aarthi M
14.	8208E21CPF002	Ashika Banu J
15.	8208E21CPF005	Gopinath P
16.	8208E21CPF006	Guru G
17.	8208E21CPF007	Hema R
18.	8208E21CPF009	Kiruthika B
19.	8208E21CPF010	Meera R
20.	8208E21CPF011	Nanthini Bharathi R
21.	8208E21CPF013	Priyadharshini J
22.	8208E21CPF014	Priyadharshini V
23.	8208E21CPF017	Subraja A
24.	8208E21CPF018	Varshini M

Course Coordinator

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DATA ANALYTICS IN R

MATERIALS

Data analysis, is a process for obtaining raw data, and subsequently converting it into information useful for decision-making by users. Data, is collected and analyzed to answer questions, test hypotheses, or disprove theories. Data has been the buzzword for ages now. Either the data being generated from large-scale enterprises or the data generated from an individual, each and every aspect of data needs to be analyzed to benefit yourself from it. But how do we do it? Well, that's where the term 'Data Analytics' comes in. In this blog on 'What is Data Analytics?', you will get an insight of this term with a hands-on.

Why is Data Analytics important?

Data Analytics has a key role in improving your business as it is used to gather hidden insights, generate reports, perform market analysis, and improve business requirements.

What is the role of Data Analytics?

- **Gather Hidden Insights** – Hidden insights from data are gathered and then analyzed with respect to business requirements.
- **Generate Reports** – Reports are generated from the data and are passed on to the respective teams and individuals to deal with further actions for a high rise in business.
- **Perform Market Analysis** – Market Analysis can be performed to understand the strengths and weaknesses of competitors.
- **Improve Business Requirement** – Analysis of Data allows improving Business to customer requirements and experience.

Now that you know the need for Data Analytics, let me quickly elaborate on what is Data Analytics for you.

What is Data Analytics for Beginners?

Data Analytics refers to the techniques used to analyze data to enhance productivity and business gain. Data is extracted from various sources and is cleaned and categorized to analyze

various behavioral patterns. The techniques and the tools used vary according to the organization or individual.

So, in short, if you understand your Business Administration and have the capability to perform Exploratory Data Analysis, to gather the required information, then you are good to go with a career in Data Analytics.

So, now that you know what is Data Analytics, let me quickly cover the top tools used in this field.

What are the tools used in Data Analytics?

With the increasing demand for Data Analytics in the market, many tools have emerged with various functionalities for this purpose. Either open-source or user-friendly, the top tools in the data analytics market are as follows.

- **R programming** – This tool is the leading analytics tool used for statistics and data modeling. R compiles and runs on various platforms such as UNIX, Windows, and Mac OS. It also provides tools to automatically install all packages as per user-requirement.
- **Python** – Python is an open-source, object-oriented programming language that is easy to read, write, and maintain. It provides various machine learning and visualization libraries such as Scikit-learn, TensorFlow, Matplotlib, Pandas, Keras, etc. It also can be assembled on any platform like SQL server, a MongoDB database or JSON
- **Tableau Public** – This is a free software that connects to any data source such as Excel, corporate Data Warehouse, etc. It then creates visualizations, maps, dashboards etc with real-time updates on the web.
- **QlikView** – This tool offers in-memory data processing with the results delivered to the end-users quickly. It also offers data association and data visualization with data being compressed to almost 10% of its original size.
- **SAS** – A programming language and environment for data manipulation and analytics, this tool is easily accessible and can analyze data from different sources.
- **Microsoft Excel** – This tool is one of the most widely used tools for data analytics. Mostly used for clients' internal data, this tool analyzes the tasks that summarize the data with a preview of pivot tables.
- **RapidMiner** – A powerful, integrated platform that can integrate with any data source types such as Access, Excel, Microsoft SQL, Tera data, Oracle, Sybase etc. This tool is mostly used for predictive analytics, such as data mining, text analytics, machine learning.
- **KNIME** – Konstanz Information Miner (KNIME) is an open-source data analytics platform, which allows you to analyze and model data. With the benefit of visual programming, KNIME provides a platform for reporting and integration through its modular data pipeline concept.
- **OpenRefine** – Also known as GoogleRefine, this data cleaning software will help you clean up data for analysis. It is used for cleaning messy data, the transformation of data and parsing data from websites.
- **Apache Spark** – One of the largest large-scale data processing engine, this tool executes applications in Hadoop clusters 100 times faster in memory and 10 times faster on disk. This tool is also popular for data pipelines and machine learning model development.

How to Become a Data Analyst?

Data analysts translate numbers into plain English. A Data Analyst delivers value to their companies by **taking information** about specific topics and then **interpreting, analyzing**, and presenting findings in comprehensive **reports**. So, if you have the capability to collect data from

various sources, analyze the data, gather hidden insights, and generate reports, then you can become a Data Analyst. Refer to the image below:

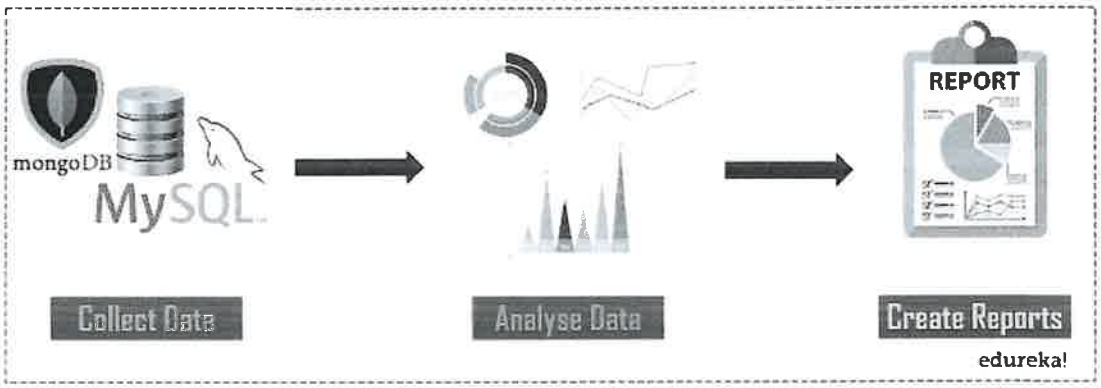

Fig 1: Process of Data Analysis - What is Data Analytics

Apart from the above-mentioned capabilities, a Data Analyst should also possess skills such as Statistics, Data Cleaning, Exploratory Data Analysis, and Data Visualization. Also, if you have a knowledge of Machine Learning, then that would make you stand out from the crowd.

On average, a Data Analyst can expect a salary of **₹404,660 (IND)** or **$83,878 (US).** As experts, data analysts are often called on to use their skills and tools to provide competitive analysis and identify trends within industries.

So, now that you know a handful about Data Analytics, let me show you a hands-on in R, where we will analyze the data set and gather some insights

Classification of data

The method of arranging data into homogeneous classes according to the common features present in the data is known as classification.

A planned data analysis system makes the fundamental data easy to find and recover. This can be of particular interest for legal discovery, risk management, and compliance. Written methods and sets of guidelines for data classification should determine what levels and measures the company will use to organise data and define the roles of employees within the business regarding input stewardship.

Once a data -classification scheme has been designed, the security standards that stipulate proper approaching practices for each division and the storage criteria that determines the data's lifecycle demands should be discussed.

Objectives of Data Classification

The primary objectives of data classification are:

- To consolidate the volume of data in such a way that similarities and differences can be quickly understood. Figures can consequently be ordered in sections with common traits.
- To aid comparison.
- To point out the important characteristics of the data at a flash.
- To give importance to the prominent data collected while separating the optional elements.
- To allow a statistical method of the materials gathered.

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VALUE ADDED COURSE ON
"DATA ANALYTICS IN R"

FROM 04/04/2022 TO 09/04/2022

Assessment Questions

Multiple Choice Questions (10*5 = 50)

1. What is the output of the following code in R?
   x <- c(1, 2, 3) y <- c(4, 5, 6) z <- x + y
   A. An error message
   B. The vector [5, 7, 9]
   C. The vector [1, 2, 3, 4, 5, 6]
   D. The vector [1, 4, 9]
   Answer : B

2. What is the output of the following code in R?
   x <- c(1, 2, 3)
   y <- c(4, 5, 6)
   z <- cbind(x, y)
   A. matrix with two rows and three columns
   B. A matrix with three rows and two columns
   C. A list with two elements
   D. An error message
   Answer: A

3. What is the output of the following code in R?
   x <- c(1, 2, 3, 4, 5) mean(x)
   A. 3
   B. 3.5
   C. 4
   D. 5
   Answer: B

4. Which of the following is a valid way to read in a CSV file in R?
   A. read.csv("data.csv")
   B. read.table("data.csv")
   C. read.excel("data.csv")
   D. load("data.csv")
   Answer : A

5. Amongst which of the following is / are the true about regression analysis?
   A. Describes associations within the data
   B. Modeling relationships within the data
   C. Answering yes/no questions about the data
   D. All of the mentioned above
   Answer: B

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6. Linear Regression is the supervised machine learning model in which the model finds the best fit ___ between the independent and dependent variable.
   A. Linear line
   B. Nonlinear line
   C. Curved line
   D. All of the mentioned above
   Answer: A

7. The process of quantifying data is referred to as ___.
   A. Decoding
   B. Structure
   C. Enumeration
   D. Coding
   Answer: C

8. __ are used when we want to visually examine the relationship between two quantitative variables.
   A. Bar graph
   B. Scatterplot
   C. Line graph
   D. Pie chart
   Answer: B

9. How many main statistical methodologies are used in data analysis?
   A. 2
   B. 3
   C. 4
   D. 5
   Answer: A

10. Which of the following is true about regression analysis?
    A. answering yes/no questions about the data
    B. estimating numerical characteristics of the data
    C. modeling relationships within the data
    D. describing associations within the data
    Answer :C

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Data Analytics in R - Test (50 Marks)

Each Question carries 5 marks

Register Number *

E20CPF009

Name *

nivedha k

Class *

PG final year

1.What is the output of the following code in R? *

5 points

```
x <- c(1, 2, 3) y <- c(4, 5, 6) z <- x + y
```

- ◯ A. An error message
- ◉ B. The vector [5, 7, 9]
- ◯ C. The vector [1, 2, 3, 4, 5, 6]
- ◯ D. The vector [1, 4, 9]

2. What is the output of the following code in R? * 5 points

```
x <- c(1, 2, 3)
y <- c(4, 5, 6)
z <- cbind(x, y)
```

- (●) A. matrix with two rows and three columns
- ( ) B. A matrix with three rows and two columns
- ( ) C. A list with two elements
- ( ) D. An error message

3. What is the output of the following code in R? * 5 points

```
x <- c(1, 2, 3, 4, 5) mean(x)
```

- ( ) A. 3
- (●) B. 3.5
- ( ) C. 4
- ( ) D. 5

4. Which of the following is a valid way to read in a CSV file in R? * 5 points

- (●) A. read.csv("data.csv")
- ( ) B. read.table("data.csv")
- ( ) C. read.excel("data.csv")
- ( ) D. load("data.csv")

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5. Amongst which of the following is / are the true about regression analysis? * 5 points

- ○ A. Describes associations within the data
- ◉ B. Modeling relationships within the data
- ○ C. Answering yes/no questions about the data
- ○ D. All of the mentioned above

6. Linear Regression is the supervised machine learning model in which the model finds the best fit____between the independent and dependent variable * 5 points

- ◉ A. Linear line
- ○ B. Nonlinear line
- ○ C. Curved line
- ○ D. All of the mentioned above

7. The process of quantifying data is referred to as____. * 5 points

- ○ A. Decoding
- ○ B. Structure
- ◉ C. Enumeration
- ○ D. Coding

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8.___are used when we want to visually examine the relationship between two quantitative variables. * 5 points

- ○ A. Bar graph
- ◉ B. Scatterplot
- ○ C. Line graph
- ○ D. Pie chart

9. How many main statistical methodologies are used in data analysis? * 5 points

- ◉ A. 2
- ○ B. 3
- ○ C. 4
- ○ D. 5

10. Which of the following is true about regression analysis? * 5 points

- ○ A. answering yes/no questions about the data
- ○ B. estimating numerical characteristics of the data
- ◉ C. modeling relationships within the data
- ○ D. describing associations within the data

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON

"DATA ANALYTICS IN R"

PG-CSE

Assessment Mark Statement

S.NO	REGISTER NUMBER	NAME OF THE STUDENT	Marks
1.	E20CPF001	Abinaya M.D	45
2.	E20CPF002	Abinaya G	50
3.	E20CPF003	Ajeetha G	45
4.	E20CPF004	Akalya S	40
5.	E20CPF005	Bharathidhasan A	40
6.	E20CPF006	Jayasri S	50
7.	E20CPF007	Kayalvizhi R	50
8.	E20CPF008	Mahesh A	45
9.	E20CPF009	Nivedha K	50
10.	E20CPF010	Pragathi J	45
11.	E20CPF011	Preethi K	40
12.	E20CPF012	Sowndharya B	45
13.	8208E21CPF001	Aarthi M	35
14.	8208E21CPF002	Ashika Banu J	45
15.	8208E21CPF005	Gopinath P	45
16.	8208E21CPF006	Guru G	50
17.	8208E21CPF007	Hema R	45
18.	8208E21CPF009	Kiruthika B	45
19.	8208E21CPF010	Meera R	40
20.	8208E21CPF011	Nanthini Bharathi R	40
21.	8208E21CPF013	Priyadharshini J	50
22.	8208E21CPF014	Priyadharshini V	40
23.	8208E21CPF017	Subraja A	40
24.	8208E21CPF018	Varshini M	50

Course Coordinator

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VALUE ADDED COURSES ON

"DATA ANALYTICS IN R"

PG - CSE

ASSESSMENT ANALYSIS REPORT

S.NO	REGISTER NUMBER	NAME OF STUDENT	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1.	E20CPF001	Abinaya M.D	5	5	5	5	5	5	5	5	0	5
2.	E20CPF002	Abinaya G	5	5	5	5	5	5	5	5	5	5
3.	E20CPF003	Ajeetha G	5	5	5	0	5	5	5	5	5	5
4.	E20CPF004	Akalya S	0	5	5	5	5	5	5	5	5	0
5.	E20CPF005	Bharathidhasan A	5	0	5	5	5	5	5	5	0	5
6.	E20CPF006	Jayasri S	5	5	5	5	5	5	5	5	5	5
7.	E20CPF007	Kayalvizhi R	5	5	5	5	5	5	5	5	5	5
8.	E20CPF008	Mahesh A	5	5	5	5	5	5	5	5	5	0
9.	E20CPF009	Nivedha K	5	5	5	5	5	5	5	5	5	5
10.	E20CPF010	Pragathi J	0	5	5	5	5	5	5	5	5	5
11.	E20CPF011	Preethi K	5	5	0	5	5	5	5	5	5	0
12.	E20CPF012	Sowndharya B	5	5	5	5	5	5	5	5	0	5
13.	8208E21CPF001	Aarthi M	0	5	5	5	0	5	5	5	5	0
14.	8208E21CPF002	Ashika Banu J	5	5	5	5	5	0	5	5	5	5
15.	8208E21CPF005	Gopinath P	5	0	5	5	5	5	5	5	5	5
16.	8208E21CPF006	Guru G	5	5	5	5	5	5	5	5	5	5
17.	8208E21CPF007	Hema R	5	5	5	5	5	5	5	5	5	0
18.	8208E21CPF009	Kiruthika B	5	5	0	5	5	5	5	5	5	5
19.	8208E21CPF010	Meera R	5	5	5	0	5	5	0	5	5	5
20.	8208E21CPF011	Nanthini Bharathi R	0	0	5	5	5	5	5	5	5	5
21.	8208E21CPF013	Priyadharshini J	5	5	5	5	5	5	5	5	5	5
22.	8208E21CPF014	Priyadharshini V	5	5	5	5	0	5	5	5	5	0
23.	8208E21CPF017	Subraja A	0	5	5	0	5	5	5	5	5	5
24.	8208E21CPF018	Varshini M	5	5	5	5	5	5	5	5	5	5
	Total		**95**	**105**	**110**	**105**	**110**	**115**	**115**	**120**	**105**	**90**
	Attainment		**79.2**	**87.5**	**91.7**	**87.5**	**91.7**	**95.8**	**95.8**	**100.0**	**87.5**	**75.0**
	Level of Attainment		**1(L)**	**2(M)**	**3(S)**	**2(M)**	**3(S)**	**3(S)**	**3(S)**	**3(S)**	**2(M)**	**1(L)**

Attainment level calculation	
>=70%-79%	1 (L)
>=80%-89%	2 (M)
>=90%	3 (S)

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Mapping of Course Outcomes Vs Program Outcomes

Comp.	Competency	Cognitive level
CO1	Install, Code and Use R Programming Language in R Studio IDE to perform basic tasks on Vectors, Matrices and Data frames.	Apply
CO2	Describe key terminologies, concepts and techniques employed in Statistical Analysis.	Understand
CO3	Understand the fundamental concepts of Data Science	Understand
CO4	Apply statistical techniques using R Programming for data analytics and decision making.	Apply
CO5	Provides solutions to businesses worldwide with the advanced analysis techniques and tools.	Analyze

CO Vs PO, PSO MAPPING

Course outcomes	Program Outcomes												Program Specific Outcomes	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO
CO1	3	3	-	3	3	-	-	-	-	-	-	1	-	3
CO2	2	1	3	3	3	-	-	-	-	-	-	2	-	3
CO3	2	2	-	-	2	-	-	-	-	-	-	2	-	2
CO4	-	1	-	-	2	-	-	-	-	-	-	-	-	3
CO5	3	-	2	-	2	-	-	-	-	-	-	2	-	3

1. Slight(Low) 2. Moderate(Medium) 3.Substantial(High) "-" No Correlation

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Feedback Form for Value Added Course

Register Number *

E20CPF012

Name *

Sowndharya B

Department *

cse

Class *

- ○ I year
- ◉ II year

Name of the Course *

Data analytics in R

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1.Value added course objectives were stated clearly and met *

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ◉ Agree
- ○ Strongly agree

2. Value added course was well organized *

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ◉ Strongly Agree

3. This Value added course increased my knowledge and skills *

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ◉ Strongly Agree

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4. Coverage of syllabus was satisfied *

- ○ Strongly disagree
- ○ Disagree
- ○ Neutral
- ○ Agree
- ◉ Strongly Agree

Any Other Suggestions *

This course was very knowledgable

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VALUE ADDED COURSE SUMMARY REPORT

1. Title : **DATA ANALYTICS IN R**
2. Name of Speaker: **MR.P.ANANDRAJ**
3. Speaker Details: **ASSOCIATE PROFESSOR, E.G.S. PILLAY ENGINEERING COLLEGE**
4. Date of speaker's presentation: **FROM 04/04/2022 TO 09/04/2022**
5. Beneficiary Details: **PG CSE STUDENTS**
6. Coordinator: **Dr.M.PRIYA (ASSO. PROFESSOR/CSE ,EGSPEC)**

COURSE CONTENT

The R programming language is purpose-built for data analysis. R is the key that opens the door between the problems that you want to solve with data and the answers you need to meet your objectives. This course starts with a question and then walks you through the process of answering it through data. Students will first learn important techniques for preparing (or wrangling) your data for analysis. Then they will learn how to gain a better understanding of your data through exploratory data analysis, helping you to summarize your data and identify relevant relationships between variables that can lead to insights. Once the data is ready to analyze, students will learn how to develop your model and evaluate and tune its performance. By following this process, students can be sure that your data analysis performs to the standards that you have set, and can have confidence in the results.

Students will build hands-on experience by playing the role of a data analyst who is analyzing airline departure and arrival data to predict flight delays. Using an Airline Reporting Carrier On-Time Performance Dataset, they will practice reading data files, preprocessing data, creating models, improving models, and evaluating them to ultimately choose the best model.

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Department of Computer Science and Engineering

Certificate of Completion

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HAS SUCCESSFULLY COMPLETED THE ONLINE VALUE ADDED COURSE ON "DATA ANALYTICS IN R" CONDUCTED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, E.G.S. PILLAY ENGINEERING COLLEGE(AUTONOMOUS), NAGAPATTINAM FROM 04.04.22 TO 09.04.22

COORDINATOR

HOD/CSE

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