Effective from Session:	2018								
Course Code	CS-469	**Title of the Course**	Advance Virtualization			**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII			3	1	0	4
Pre-Requisite	None	**Co-requisite**	None						
Course Objectives	• To learning the security concepts in virtualization • Learn to create, configure, and manage vNetwork • To understand the process of creating using and optimizing virtual machines.								

Course Outcomes	
CO1	Define backup and recovery in virtual machines using VMware Data Recovery.
CO2	Explain role-based access control
CO3	Demonstrate the process of creating, configuring and managing Network standard switches.
CO4	Analyze the CPU and memory usage using vCenter Server performance graphs and alarms
CO5	Create and manage vSphere data store.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Security Concepts**	Role Based Access Control(RBAC), Explicit Permissions, Managing User and Group Lists, Server Roles and Directory Services, Harden Virtual Machine, ESXi Hosts and vCenter Server, SSO Architecture and Components, Various Authentication Methods, SSO – Users, Installation and Policies	8	1
2	**Storage**	Storage LUNs, Configure LUNs, NFS Share, iSCSI initiator – Software, Hardware, Configure iSCSI initiator, Editing initiator Settings, Port binding, VSAN and VVOL architectural components, Managing Virtual SAN and Virtual Volumes, Storage Policies, Storage I/O Control.	8	2
3	**Networking**	Networking: Create, configure, and manage vNetwork standard switches, Create, configure, and manage network connections, Create, configure, and manage port groups, Storage: Configure ESX/ESXi with iSCSI, NFS, Create and manage vSphere data stores.	8	3
4	**Virtual Machines**	Virtual Machines: Deploy virtual machines using VMware vCenter Converter, Resource Monitoring, Control virtual machine access to CPU, memory, and I/O resources, Introduce VM kernel methods for optimizing CPU and memory usage Monitor resource usage using vCenter Server performance graphs and alarms, Data Protection: Back up and recover virtual machines using VMware Data Recovery.	8	4
5	**Scalability**	Manage multiple vCenter Server inventories using VMware vCenter Linked Mode, Manage ESX/ESXi configuration compliance using Host Profiles, Create, configure, and manage vNetwork distributed switches, network connections, and port groups, Configure and manage a VMware Distributed Resource Scheduler cluster High Availability, Configure and manage a VMware High Availability cluster, Configure fault-tolerant virtual machines using VMware Fault Tolerance, Patch Management: Manage patching and patch compliance using vCenter Update Manager	8	5

Reference Books:

John A. Davis, Steve Baca, Owen Thomas, "VCP6-DCV Official Cert Guide (Exam #2V0-621)", 3rd Edition, VMware Press.

"Nick Marshal, "Mastering VMware vSphere 6", 1st Edition, Wiley Publications

e-Learning Source:

https://onlinecourses.nptel.ac.in/noc21_cs15/preview

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3									1	1	2	2
CO2	3	2		3								2	3	2	2
CO3	3	3	3	2									2	1	2
CO4	3	3		2								3	2	3	1
CO5	3	2	3												

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2018								
Course Code	CS-462	**Title of the Course**	Cloud Web Services		**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII		3	1	0	4
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	To learn how to use Cloud Services • To understand the implementation of Virtualization using AWS cloud • To Build Private Cloud using							

Course Outcomes	
CO1	State various EC2 instance types.
CO2	Explain the Amazon Simple Storage Service
CO3	Demonstrate the procedure of deploying Scalable Application on AWS
CO4	Analyze security in AWS Key Management service
CO5	Create EC2 instances in public and private VPC.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Introduction to Cloud Computing and Amazon Web Services**	Introduction to Cloud Computing, Cloud Service Delivery Models (IAAS, PAAS, SAAS), Cloud Deployment Models (Private, Public, Hybrid and Community), Cloud Computing Security, Case Study.Introduction to Amazon Web Services, Why Amazon? Use Cases, AWS Storage Options, AWS Compute Options, AWS Database Options, AWS Workflow Automation and Orchestration Options, AWS Systems Management and Monitoring Options, AWS Virtual Private Cloud Introduction, Pricing Concepts.	8	1
2	**Introduction to EC2**	Introduction To EC2, Instance Types And Uses, Auto scaling Instances, Amazon Machine Images (AMIS), Modifying Existing Images, Creating New Images of Running Instances, Converting An Instance Store AMI To An EBS AMI, Instances Backed By Storage Types, Elastic IPS, Elastic Load Balancing	7	2
3	**Web Applications and Security**	Introduction to Elastic Beanstalk, Deploying Scalable Application On AWS, Selecting And Launching An Application Environment, Provisioning Application Resources with Cloud formation, Introduction to CloudWatch, Describe Amazon Cloud Watch metrics and alarms, AWS Messaging Services(SNS,SQS,SES).Introduction to AWS Security, Describe Amazon Identity and Access Management (IAM), AWS Directory Service, AWS Key Management Service, Securing Data at Rest and In Motion	9	3
4	**AWS Storage**	Amazon Storage, S3 Storage Basics, Buckets and Objects, Creating A Web Server Using S3 Endpoints, Managing Voluminous Information with EBS, Glacier Storage Service , Describe Amazon Dynamo, Understand key aspects of Amazon RDS, Launch an Amazon RDS instance.	8	4
5	**AWS Networking**	Introduction to AWS Networking , Access Control Lists (ACLs), Setting Up a Security Group, Setting Up VPC And Internet Gateway, Setting Up A VPN, Setting Up A Customer Gateway For VPN, Setting Up Dedicated Hardware For VPC, Scenario 1:VPC With A Public Subnet Only (Standalone Web), Scenario 2: VPC with Public And Private Subnets (3 Tier App), Scenario 3:VPC With Public And Private Subnets And Hardware VPN Access (Web On The Cloud, Database and App On Prem) Scenario 4: VPC With A Private Subnet Only And Hardware VPN Access. (Extension of Your Corporate Network), Route53 for DNS System, Cloud front, Case Study	8	5

Reference Books:

Joe Baron, Hisham Baz , Tim Bixler , Biff Gaut , Kevin E. Kelly , Sean Senior , John Stamper , "AWS Certified Solutions Architect Official Study Guide: Associate Exam, John Wiley and Sons Publications, 2017

Yohan Wadia , "AWS Certified Solutions Architect Official Study Guide: Associate Exam, John Packt Publishing, 2016

Bernald Golden, "Amazon Web Services for Dummies", John Wiley & Sons, 2013

e-Learning Source:

https://onlinecourses.nptel.ac.in/noc22_cs20/preview

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3									3	1	2	2
CO2	3	3	1	3						1		3	3	2	2
CO3	3	3	3	2	2							3	2	1	2
CO4	3	3	3	2		1			3			3	2	3	1
CO5	3	3	3		2	2			3			3			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS-461	**Title of the Course**	Cyber Forensics & Investigation	**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII	3	1	0	4
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives		To provide an understanding Computer forensics fundamentals, analyze various computer forensics technologies, identify methods for data recovery and apply the methods for preservation of digital evidence.					

Course Outcomes	
CO1	Learn **[L1: Knowledge]**the basics of computer forensics.
CO2	Apply **[L3: Application]**the knowledge of cyber laws in the forensics' cases.
CO3	Illustrate **[L3: Application]** the solution to Recovering from Cyber Security Incidents
CO4	Analyze**[L4: Cyber Law]** knowledge of cyber laws and IT Acts
CO5	Analyze**[L5: Analysis]** and implement various Forensics Techniques

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Computer Forensics**	Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure-Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure, Case Studies.	8	1
2	**Storage Devices & Data Recover Methods**	Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium, Working of Storage devices-Platter, Head assembly, spindle motor, Data Acquisition, Data deletion and data recovery method and techniques, volatile data analysis, Case Studies.	8	2
3	**Forensics Techniques**	Windows forensic, Linux Forensics, Network forensics – sources of network-based evidence, other basic technical fundamentals, Mobile Forensics – data extraction & analysis, Steganography, Password cracking-Brute force, Cross-drive analysis, Live analysis, deleted files, stochastic forensics, Dictionary attack, Rainbow attack, Email Tacking – Header option of SMTP, POP3, IMAP, examining browsers, Case Studies.	9	3
4	**Cyber Law**	Corporate espionage, digital evidences handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment), Case Studies, Incident specific procedures – virus and worm incidents, Hacker incidents, Social incidents, physical incident, Guidelines for writing forensic report.	7	4
5	**Forensic Analysis of Web Application**	Forensic analysis of web server, network analysis of web server compromise, web server log analysis, web application forensic, forensic analysis of web application security, intruder profiling, forensic for code injection attack, Case Studies	8	5

Reference Books:

Computer Forensics: Computer Crime Scene Investigation by John Vacca, Laxmi Publications, 1st ed; 2015

Digital Forensic: The Fascinating World of Digital Evidences by Nilakshi Jain, et.al, Wiley, 1st ed; 2016

The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by John Sammons, Syngress, 2nd ed; 2014

Cyber Forensics in India: A Legal Perspective by Nishesh Sharma, Universal Law Publishing - an imprint of LexisNexis; First 2017 edition

Network Forensics:Tracking Hackers Throu by Davidoff, Pearson India, 1st ed; 2013

Hacking Exposed Computer Forensics by Aaron Philipp, David Cowen, McGraw Hill, 2nd ed; 2009

Mastering Mobile Forensics by Soufiane Tahiri, Packt Publishing, 1st ed; 2016

Computer Forensics: A Beginners Guide by David Cowen, McGraw Hill, 1st ed; 2013

Practical Digital Forensics Kindle Edition by Richard Boddington, Packt Publishing, 1st ed; July 2016.

Learning Network Forensics by Samir Datt, Packt Publishing, 1st ed; 2016.

e-Learning Source:

https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2									3	1	2	2
CO2	3	3	2	1	2							3	3	2	2
CO3	3	3	2	2	2							3	2	1	2
CO4	3	2	3	2	2							2	2	3	1
CO5	3	2	2	2	1							2	2	2	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS464	**Title of the Course**	Disaster Recovery and Business Continuity Management	**L**	**T**	**P**	**C**	
Year	IV	**Semester**	VII	3	1	0	4	
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	To make understand the importance of Disaster Recovery and Business Continuity Management • To develop a completed, customized plan • To identify, analyze and address your organization's risks							

Course Outcomes	
CO1	Identify[L1: Knowledge] and address the organization's risks
CO2	Explain[L2: Compr ehension]Business Resumption Plan (BRP), Disaster Recovery Plan (DRP) andCommon terminologies used in BCP and DRP
CO3	Compare[L3: Application] the different types of tests including structured walk-through
CO4	Analyze[L4: Analysis] the organization's risks
CO5	Organize [L4: Organize] a case study of IT Organization and prepare a Business Continuity Planfor the same using the learning from this course.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Business Continuity Management**	Introduction to Business Continuity Planning (BCP), Business Resumption Plan (BRP) or Disaster Recovery Plan (DRP), Common terminologies used in BCP and DRP, Business Continuity Management (BCM), NIST SP800-34 Emergency Action plan which includes the phases of Recover/Resume, Protect and Sustain, Causes of Disasters.	8	1
2	**Stages in BCP**	BCP objectives. Information Protection Environment. Security Technology and Tools. Steps involved in creating a BCP, Phase 1: Project Management and Initiation. Phase 2: Business Impact Analysis. Phase 3: Recovery Strategies, Phase 4: Plan Development and Implementation.	8	2
3	**Business Recovery strategies**	Facility and Supply Recovery strategies. User Recovery strategies. Technical Recovery strategies, Data Recovery strategies, Activation Phase- Major Disaster or Disruption, Intermediate Disaster or Disruption, Minor Disaster, Activating BC/DR Teams, Developing Triggers, Transition Trigger. Defining BC/DR Team and Key Personnel, Defining Tasks, Assigning Resources, Communication Plan.	7	3
4	**Testing, Maintenance, Awareness & Training Mechanisms**	Different types of tests including structured walk-through, checklist test, simulation, parallel test and full interruption test. Steps required to maintain a BCP.	6	4
5	**Preparation of BCP**	Requirements for BCP awareness and training, Conduct a case study of IT Organization and prepare a Business Continuity Plan for the same using the learning from this course.	8	5

Reference Books:

Business Continuity and Disaster Recovery Planning for IT Professionals by Susan Snedaker, Syngress; 2 edition (31 October 2013)

Business Continuity and Disaster Recovery Planning by Stuart Hotchkiss, BCS, The Chartered Institute for IT, 1st ed; 2011

Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole, Wiley, 1st ed; 2008

Planning for Disaster: A Business Survival Guide by Harry Flowers, CreateSpace Independent Publishing Platform; 1 edition (15 August 2015)

Disaster Management: How to Conduct Business Continuity and Disaster Recovery During Disaster Planning, Response and Recovery: 3 (Disaster Management How To Series) by Ian Watts, CreateSpace Independent Publishing Platform; 1 edition (28 November 2016)

Simple Guidelines for Successful Disaster Recovery Planning: What are the steps to create an emergency response plan, and how would you utilize this plan by Harry R Fisher, CreateSpace Independent Publishing Platform (27 January 2015)

Business Continuity from Preparedness to Recovery: A Standards-Based Approach by Eugene Tucker, Butterworth-Heinemann; 1 edition (5 January 2015)

e-Learning Source:

https://nptel.ac.in/courses/124107010

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2			2						3	3	3	2
CO2	3	3	2	3		2						3	3	2	2
CO3	3	3	2	2	2							3	3	3	3
CO4	3	2	3	2		1						2	3	3	2
CO5	3	2	2		2							2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS-468	**Title of the Course**	Exchange Server Administration	**L**	**T**	**P**	**C**	
Year	IV	**Semester**	VII	3	1	0	4	
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	Implementation of exchange server and virtualization.							

Course Outcomes	
CO1	Learn the basics of exchange server.
CO2	Apply the knowledge of implementation of server.
CO3	Illustrate Introduction power shell.
CO4	Analyze knowledge of implementing server role
CO5	Analyze Introduction of power shell

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Putting Exchange Server 2013 into context, Introducing Change in Exchange Server 2013Significance of e-mail communication**	Importance of Email, Messaging Services, Exchange Server, Many modes of access, The Universal Inbox, Architecture Overview. Controlling Mailbox growth, Personal folders or PST files, Email archiving, Public Folders, Things every Email-administrators should know, Tools. Exchange Server 2013: Getting to know Exchange Server 2013, Exchange Server Architecture, x64 processor requirement, Windows Server 2008 R2 and Widows Server 2012 Installer, Service Pack and Patching Improvements Server roles, Edge Transport Services, Unified Messaging and Client Connectivity. The managed store, High-Availability Features Content Storage, Exchange Server Management, Improved Message and Content Control, Built-in Archiving, Message Transport Rules, Message Classifications, Rights Management, Service Message Protection Programming Interfaces, New and Improved Outlook Web App, Mobile Clients and Improved Security.	8	1
2	**Understanding Availability, Recovery, Compliance, and Virtualization Server Exchange 2013**	What's in a Name, Backup and Recovery, Disaster Recovery, Management Frameworks, A Closer Look at Availability, Storage Availability , An Overview of Exchange Storage, Direct Attached Storage, Storage Area Networks, Compliance and Governance, The Bottom Line. Virtualization Overview, Understanding Virtualized Exchange, Understanding Your Exchange Environment Effects of Virtualization, Environmental Impact, Space Impact, Complexity Impact, Additional Considerations, Virtualization Requirements, Hardware Requirements, Software Requirements, Operations, Deciding What to Virtualized, Exchange Roles ,Testing, Possible Virtualization Scenarios, Small Office/Remote or Branch Office , Site Resilience, Mobile Access	9	2
3	**Introducing Power Shell, Exchange Management Shell and Getting Exchange Server Running**	Why Use Power Shell, Understanding the Command Syntax, Verbs and Nouns, The - Identity Parameter, Cmdlet Parameters, Alias, Object-oriented Use of Power Shell, Filtering Output, Formatting Output, Directing Output to Other Cmdlets, Power Shell v3, Remote Power Shell, Tips and Tricks, Managing Output, Running Scripts, Running Scheduled Power Shell Scripts, Debugging and Troubleshooting from Power Shell, Auto discover Concepts, What Auto discover Provides, How Auto discover Works. Hardware, Operating Systems, Configuring Windows, Understanding Server Role and Configuration, Active Directory Requirements, Installing Exchange Server 2013, GUI-based Installation, Command-line Installation, Post-installation Configuration Steps, Final Configuration.	9	3
4	**Understanding Server roles, configuration, Exchange server 2013 requirement and Installation**	Server Roles, exchange server 2013 server roles, mailbox server, client access server, possible role configurations, combined-function server, scaling exchange server 2013 roles. Selecting the right server hardware, the typical user, CPU recommendations, memory recommendations, network recommendations, disk recommendations, software recommendations, operating recommendations, windows 7/windows 8 management consoles, additional requirement, active directory requirement, installation and preparation permissions.	7	4
5	**Introducing Power Shell and Exchange Management Shell**	Why Use Power Shell, Understanding the Command Syntax, Verbs and Nouns, The - Identity Parameter, Camlet Parameters, Alias, Object-oriented Use of Power Shell, Filtering Output, Formatting Output, Directing Output to Other Camlets, Power Shell v3 , Remote Power Shell, Tips and Tricks, Managing Output, Running Scripts, Running Scheduled Power Shell Scripts, Debugging and Troubleshooting from Power Shell, Auto discover Concepts, What Auto discover Provides , how Auto discover Works. Getting Exchange Server Running. Hardware, Operating Systems, Configuring Windows, Understanding Server Role and Configuration,Active Directory Requirements, Installing Exchange Server 2013, GUI-based Installation, Command-line Installation, Post-installation Configuration Steps, Final Configuration	7	5
Reference Books:				
Mastering Exchange server 2013 by David Elfassy				
"Microsoft Exchange Server 2013 Unleashed " By Rand Morimoto, Michael Noel, Guy Yardeni, Chris Amaris, Andrew Abbate, Technical Edit by Ed Crowley, 2012 edition.				
e-Learning Source:				
https://archive.nptel.ac.in/content/storage2/courses/106106107/Module-1.pdf				

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3									3	1	2	2
CO2	3	3	1	3						1		3	3	2	2
CO3	3	3	3	2	2							3	2	1	2
CO4	3	3	3	2		1			3			3	2	3	1
CO5	3	3	3		2	2			3			3			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS-470	**Title of the Course**	Infrastructure Automation	**L**	**T**	**P**	**C**	
Year	IV	**Semester**	VII	3	1	0	4	
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	Implementation of Chef and chef client.							

Course Outcomes	
CO1	Learn Introduction about Chef
CO2	Apply Installation of COOKBOOKS and chef server
CO3	Illustrate the function of chef client
CO4	**A**nalyze importance of puppet
CO5	**A**nalyze Introduction of puppet Environment and MCollective

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Introduction to Chef**	Idem potency/convergence - test & repair model - Common resources and their actions- Default actions- The ':nothing' action - The 'supports' directive - The 'not_if' and 'only_if' directives - Resource extensibility -RECIPES: What a recipe is - Importance of the resource order - How to use 'include_recipe' - What happens if a recipe is included multiple times in a run_list - The 'notifies' and 'subscribes' directives	8	1
2	**COOKBOOKS and chef server**	Cookbook contents - Naming conventions - Cookbook dependencies - The default recipe - How the Chef server acts as an artifact repository - How the Chef server acts as an index of node data - Chef solo vs Chef server - Chef server's distributed architecture - Scalability	7	2
3	**Chef Client**	The function of Chef client vs the function of Chef server - What 'why-run' is - How to use '--local-mode' - How the Chef client and the Chef server communicate - The Chef client configuration - What a node is - What a node object is - How a node object is stored on Chef server - How to manage nodes - How to query nodes - How to name nodes	8	3
4	**Puppet infrastructure & Resource and manifests**	Introduction To Configuration Management - Importance of puppet - How To Access Your Working Files - Puppet Agents - Puppet Masters Systems Orchestration - Cross Platform Puppet. Introduction To Puppet Run Cycle - Gathering System Facts - Node Matching And Catalogue Compilation - Puppet Resources - How To Define System Resources - Applying A Simple Puppet Manifest - Puppet Types - The Package File Service Pattern - Applying Conditional - - Logic In Puppet - Fact Conditionals - Choosing A Course Of Action.	9	4
5	**Puppet Environment and MCollective**	Defining Nodes - Puppet Modules - Reusable Code - Forge Modules - Where To Find Reusable Code - Provisioning A Web Server - Class Parameters - Applying Variables - Hiera Parameters - Defining Variables - Executing Modules Against A Puppet Master With An Agent - Reporting With Puppet - MCollective And Live Management - MCollective With Puppet - Using MCollective To Interact With Services - Using MCollective To Interact With Puppet	8	5

Reference Books:
Managing Infrastructure with Puppet Paperback – 29 Jun 2011 by James Loope
Chef Cookbook Paperback – Import, 3 Feb 2017 by Matthias Marschall (Author)
DevOps for Beginners: Hands-on Guide Kindle Edition by David Johnson– 2016 edtion
e-Learning Source:
https://nptel.ac.in/courses/105106115

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2			2						3	3	3	2
CO2	3	3	2	3		2						3	3	2	2
CO3	3	3	2	2	2							3	3	3	3
CO4	3	2	3	2		1						2	3	3	2
CO5	3	2	2		2							2	3	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS-471	**Title of the Course**	IT Governance, Risk and Information Security Management	**L**	**T**	**P**	**C**	
Year	IV	**Semester**	VII	3	1	0	4	
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	• To make understand the importance of IT Governance, Risk and Information Security Management • To develop a Risk Management Program. • To identify, analyse and address various outcomes of effective							

Course Outcomes	
CO1	State Best Practices for IT Governance and Role of Governance in InformationSecurity
CO2	Explain role of strategic planning for IT, strategic direction and alignment of security strategy with business objectives
CO3	Illustrate the Val-IT framework of ISACA
CO4	Analyze Role of IT Strategy Committee and Security Steering Committee
CO5	Design an IT governance strategy for a particular cloud provider of your choice byfollowing the best practices for IT Governance.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**IT Governance- Part 1**	Introduction & Concepts, Origin of Governance, Corporate Governance, Best Practices for IT Governance, Role of Governance in Information Security, Six outcomes of effective Security Governance, benefits of good governance, Cultural aspects in governance.	8	1
2	**IT Governance- Part 2**	ITGovernance-Roles and Responsibilities, Role of IT Strategy Committee and Security Steering Committee, Standard IT Balanced Scorecard. Val-IT framework of ISACA, Governance in multi-department and multi-country enterprises, Importance of Governance in establishing a sustainable Security Culture in the organization.	8	2
3	**Information Systems Strategy**	Role of Strategic Planning for IT, Strategic Direction and Alignment of Security Strategy with Business Objectives, Role of CISO, Security Metrics Program.	8	3
4	**Risk Management Program**	Develop a Risk Management Program. Risk Management Process, Roles and Responsibilities, Risk-IT Framework of ISACA, Strategic Security decisioning using Risk Management	8	4
5	**Information Security Management**	Introduction, Performance Optimization, Management Information Security Forum, Segregation of Duties, Description of COBIT and other Frameworks, Security Program Effectiveness, Continuous Assessment and Improvement, In-sourcing versus Out-sourcing, Impact of ISM program across organization.	8	5

Reference Books:
Information Security Governance by S.H. Solms, Rossouw Solms, Springer; 1st Edition. 2nd Printing, 2008 edition (12 December 2008)
IT Governance: How Top Performers Manage IT Decision Rights for Superior Results by Weill, Harvard Business Review Press; First edition (1 June 2004).
ISACA publications.
Managing Risk and Information Security by Malcolm Harkins, Apress; 1 edition, 2012
IT Governance: An International Guide to Data Security and ISO27001/ISO27002 by Alan Calder, Steve Watkins, Kogan Page; 6 edition (3 September 2015)
ISACA publications on COBIT, RiskIT and ValIT
Information Security Governance: Guidance for Information Security Managers by W. Krag Brotby and IT Governance Institute, Isaca (2 June 2008)
COBIT 5 Framework Perfect by Isaca, (10 April 2012)
Cobit 5 Foundation-reference and Study Guide by Ana Cecilia Delgado, CreateSpace Independent Publishing Platform; Stg edition (20 June 2016)
Governance of Enterprise IT Based on COBIT 5: A Management Guide by Geoff Harmer (Author), IT Governance Publishing, (6 February 2014)
e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2		3	1		3			3	3	3	2
CO2	3	3	2	3		2						3	3	2	2
CO3	3	3	2	2	2							2	3	3	3
CO4	3	3	3	2		1						3	3	3	2
CO5	3	3	3		2				3			3	3	2	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018								
Course Code	CS-463	**Title of the Course**	Linux Administration		**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII		3	1	0	4
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	Linux Administration Certification training is designed to shape you as a Linux professional & help you to run applications, perform desired functions on your system and networks, create a network configuration, and maintain security administration.							

Course Outcomes	
CO1	Learn [L1: Knowledge] and remember factual knowledge relevant to system administration tools andtechnologies in Linux based OS
CO2	Learn [L1: Knowledge] to do file processing, process management, storage backup, account management etc.
CO3	Apply [L3: Application] the knowledge to manage resources and security of a computer runningLinux
CO4	Analyze [L4: Analysis] and make effective use of Unix utilities, and scripting languages
CO5	Implementation[L5: Implementation] installation of OpenSSH

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Introduction to Linux**	Introduction to Operating system - Types of Operating system - Multi user operating system - Open source licensing - History of Linux - Unix Vs Linux - Flavors of Linux - Benefits and characteristics of Linux - Installation of Linux - Linux booting process - Log in and switch users in multiuser run levels - Shell and bash features - Linux kernel - sudo vs su - Date and time configuration – Linux run levelsDirectories and files : Directory structure - System directory - Absolute path and relative path -Creating and removing directory - Changing directory path - Creating - removing - copying and moving files - File Permissions - Links – hard link and soft link - Input and output redirection - Filters and pipes - Locate - read - and use system documentation including man page	9	1
2	**Package, User and group Management**	RPM - YUM - Archive - Compress - unpack and uncompress files using tar - star - gzip - and bzip2 - Create - delete - and modify local user accounts - Change passwords for local user accounts - Create - delete - and modify local groups and group memberships - Changing owner and modes	6	2
3	**Configuring local storage and filesystem**	List - create - delete - and partition type for primary - extended - and logical partitions - Create and remove physical volumes - assign physical volumes to volume groups - Create and delete logical Volumes. - Create - mount - unmount - ext2 - ext3 - and ext4 file systems. - Mount - unmount - and LUKS-encrypted file systems - Access control list	7	3
4	**Managing system and infrastructure services**	Managing system services - Shutting down - suspending and hibernating the system - Controlling systemd on remote machine - Creating and modifying systemd unit files – DHCP Configuration - HTTP server Configuration - FTP server Configuration - Mail server Configuration - Samba server Configuration - NTP server Configuration - NFS server Configuration	7	4
5	**OpenSSH and Linux security**	OPENSSH - The SSH Protocol - Configuring OpenSSH and Starting an OpenSSH Server Key-Based Authentication in OpenSSH - OpenSSH Clients - Using the ssh Utility - scp Utility and sftp Utility - Configure firewall settings using system-config-firewall or iptables - Set enforcing and permissive modes for SELinux - List and identify SELinux file and process context.	6	5

Reference Books:

Orsaria, Jang, "RHCSA/RHCE Red Hat Linux Certification Study Guide Exams EX200 & EX300", McGraw-Hill Education, July 2017.

Sander Van Vugt, "Red Hat RHCSA/RHCE 7 Cert Guide: Red Hat Enterprise Linux 7 (EX200 and EX300)", Phi Learning Pvt Ltd, 2009.

e-Learning Source:

https://nptel.ac.in/courses/117106113

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2									3	1	2	2
CO2	3	3	2	1	2							3	1	2	1
CO3	3	3	2	2	2							3	2	2	1
CO4	3	2	3	2	2							2	2	2	2
CO5	3	2	2	2	1							3	2	2	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2018								
Course Code	CS-473	**Title of the Course**	PCI DSS & HIPAA	**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII	3	1	0	4
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	Introduction about PCI, DSSand HIPPA.						

Course Outcomes	
CO1	Learn **[L1: Knowledge]**the basics of ISO 27001
CO2	Apply **[L3: Application]**the knowledge of Information Security audit check listing
CO3	Illustrate **[L3: Application]** PSI DSS into Business as usual processes
CO4	Analyze**[L4: HIPAA]** knowledge of HIPAA security Rule.
CO5	Analyze**[L5: Analysis]** knowledge about workstation security

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**ISO 27001**	Auditing: Principles of auditing, Conducting and Managing an Audit Program. Auditing Activities: Scoping and Pre audit Survey, Planning and preparation, Fieldwork, Analysis, Reporting, Closure, Competence and evaluation of auditors: Auditor competence, Information Security Management System Audit Testing: Information security management system, Management responsibility, Internal ISMS audits, Management review of the ISMS, ISMS improvement	8	1
2	**Information Security Audit Check Listing**	Security Policy, Organizing information security, Asset management, Human resources security, Physical and environmental security, Communications and operations management, Access control, Information systems acquisition, development and maintenance, Information security incident management, Business continuity management, Compliance.	8	2
3	**PCI DSS**	Scope of PCI DSS Requirements, Best Practices for Implementing PCI DSS into Business-as-Usual Processes, PCI DSS Assessment Process, PCI DSS Requirements: Build and Maintain a Secure Network and Systems, Protect Cardholder Data, Maintain a Vulnerability Management Program, Implement Strong Access Control Measures , Regularly Monitor and Test Networks, Maintain an Information Security Policy.	8	3
4	**HIPAA - Purpose and Scope**	HIPAA Security Rule, Security Rule Goals and Objective, Security Rule Organization, Administrative Safeguards: Security Management Process, Assigned Security Responsibility, Workforce Security, Information Access Management, Security Awareness and Training, Security Incident Procedures, Contingency Plan, Evaluation, Business Associate Contracts and Other Arrangements.	8	4
5	**Physical and Technical Safeguards**	Physical Safeguards: Facility Access Controls, Workstation Use, Workstation Security, Device and Media Controls, Technical Safeguards: Access Control, Audit Controls, Integrity, Person or Entity Authentication, Transmission Security, Organizational Requirements: Business Associate Contracts or Other Arrangements, Requirements for Group Health Plans.	8	5

Reference Books:

Information Security Policy Development for Compliance: ISO/IEC 27001, NIST SP 800-53, HIPAA Standard, PCI DSS V2.0, and AUP V5.0, Barry L. Williams, Auerbach Publications; 1 edition (6 March 2013)

Foundations of Information Security Based on ISO27001 and ISO27002 (Best Practice) by Hans Baars et.al., van Haren Publishing; 3rd Revised edition edition (15 April 2015)

e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3									3	1	2	2
CO2	3	3	1	3						1		3	3	2	2
CO3	3	3	3	2	2							3	2	1	2
CO4	3	3	3	2		1			3			3	2	3	1
CO5	3	3	3		2	2			3			3			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Effective from Session: 2018							
Course Code	CS-466	**Title of the Course**	Cloud Web Services Lab	**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII	0	0	2	1
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	To learn how to use Cloud Services • To understand the implementation of Virtualization using AWS cloud • To Build Private Cloud using						

Course Outcomes	
CO1	State various EC2 instance types.
CO2	Explain the Amazon Simple Storage Service
CO3	Demonstrate the procedure of deploying Scalable Application on AWS
CO4	Analyze security in AWS Key Management service
CO5	Create EC2 instances in public and private VPC.

S. No.	List of Experiments	Contact Hrs.	Mapped CO
1	Introduction to Amazon Simple Storage Service (S3)	2	1
2	Introduction to Amazon Cloud Front	2	1
3	Introduction to AWS Key Management Service	2	2
4	Introduction to Amazon Elastic search Service	2	2
5	Introduction to Amazon Dynamo DB	2	2
6	Introduction to Amazon API Gateway	2	3
7	Introduction to Amazon Redshift	2	3
8	Introduction to Amazon Aurora	2	3
9	Introduction to Amazon Machine Learning	2	3
10	Introduction to AWS Database Migration Service	2	4
11	Introduction to AWS Lambda	2	4
12	Introduction to AWS Internet-of-Things (IoT)	2	4
13	Introduction to AWS Device Farm	2	5
14	Introduction to Amazon Kinesis Firehose	2	5
15	Introduction to Amazon Route 53	2	5
16	Introduction to Amazon Elastic File System (EFS)	2	5
17	Challenge Lab	2	5

Reference Books:

Joe Baron, Hisham Baz , Tim Bixler , Biff Gaut , Kevin E. Kelly , Sean Senior , John Stamper , "AWS Certified Solutions Architect Official Study Guide: Associate Exam, John Wiley and Sons Publications, 2017

Yohan Wadia , "AWS Certified Solutions Architect Official Study Guide: Associate Exam, John Packt Publishing, 2016

Bernald Golden, "Amazon Web Services for Dummies", John Wiley & Sons, 2013

Joe Baron, Hisham Baz , Tim Bixler , Biff Gaut , Kevin E. Kelly , Sean Senior , John Stamper , "AWS Certified Solutions Architect Official Study Guide: Associate Exam, John Wiley and Sons Publications, 2017

e-Learning Source:

https://onlinecourses.nptel.ac.in/noc22_cs20/preview

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		3									3	1	2	2
CO2	3	3	1	3					1			3	3	2	2
CO3	3	3	3	2	2							3	2	1	2
CO4	3	3	3	2		1			3			3	2	3	1
CO5	3	3	3		2	2			3			3			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2018									
Course Code	CS-465	**Title of the Course**	Cyber Forensics & Investigation Lab			**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII			0	0	2	1
Pre-Requisite	None	**Co-requisite**	None						
Course Objectives	To provide an understanding Computer forensics fundamentals, analyze various computer forensics technologies, identify methods for data recovery and apply the methods for preservation of digital evidence.								

Course Outcomes	
CO1	Learn the basics of computer forensics.
CO2	Apply the knowledge of cyber laws in the forensics' cases.
CO3	Illustrate the solution to Recovering from Cyber Security Incidents
CO4	Analyze knowledge of cyber laws and IT Acts
CO5	Analyze and implement various Forensics Techniques

S. No.	List of Experiments	Contact Hrs.	Mapped CO
1	Physical Collection of electronic evidence using forensic standards	2	1
2	Dismantling and re-building PCs in order to access the storage media safely	2	1
3	Boot sequence and Power On Self-Test mode analysis	2	2
4	Examination of File systems of Windows, Linux and Mac	2	2
5	Analysing Word processing and Graphic file format	2	3
6	Network data sniffing and analysing	2	3
7	Password and encryption techniques	2	3
8	Internet forensic and Malware analysis	2	4
9	Data recovery techniques for hard drive	2	5
10	Data recovery techniques for Pen drive and CD	2	5

Reference Books:

Computer Forensics: Computer Crime Scene Investigation by John Vacca, Laxmi Publications, 1st ed; 2015

Digital Forensic: The Fascinating World of Digital Evidences by Nilakshi Jain, et.al, Wiley, 1st ed; 2016

The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by John Sammons, Syngress, 2nd ed; 2014

Cyber Forensics in India: A Legal Perspective by Nishesh Sharma, Universal Law Publishing - an imprint of LexisNexis; First 2017 edition

e-Learning Source:

https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2									3	1	2	2
CO2	3	3	2	1	2							3	3	2	2
CO3	3	3	2	2	2							3	2	1	2
CO4	3	2	3	2	2							2	2	3	1
CO5	3	3	2	2	2							2	2	1	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2018								
Course Code	CS-467	**Title of the Course**	Linux Administration Lab		**L**	**T**	**P**	**C**
Year	IV	**Semester**	VII		0	0	2	1
Pre-Requisite	None	**Co-requisite**	None					
Course Objectives	Linux Administration Certification training is designed to shape you as a Linux professional & help you to run applications, perform desired functions on your system and networks, create a network configuration, and maintain security administration.							

Course Outcomes	
CO1	Learn and remember factual knowledge relevant to system administration tools andtechnologies in Linux based OS
CO2	Learn to do file processing, process management, storage backup, account management etc.
CO3	Apply the knowledge to manage resources and security of a computer runningLinux
CO4	Analyze and make effective use of Unix utilities, and scripting languages
CO5	Implementation installation of OpenSSH

S. No.	List of Experiments	Contact Hrs.	Mapped CO
1	1. Configure the following tasks & verify it. (Hint - use grep/cut/tr/sed) a) List the lines containing "/sbin/nologin" from the /etc/passwd file. b) List only lines of output from ps, which lists running processes that contain the string "in c) Display the list of GIDs from /etc/passwd file. d) Alter all the letters that starts from range "a-f" to "A-F" in /etc/passwd file.	2	1
2	Create an alias named eth0:0 using below credentials in RHEL 5 and verify it. (a) IP ADRESS = 172.16.0.1 (b) 255.255.0.0 (c) Default Gateway = 172.16.0.254 (d) DNS 1 = 4.2.2.1	2	1
3	Configure password policy for user john with below arguments in RHEL 5. After configuration verify the policy applied. (a) Minimum password age = 4 days (b) Maximum password age = 15 days (c) Inactive days = 2 days (d) Account Expiration date = 6 months from today	2	2
4	Configure the following tasks: (a) Add user accounts to your system: Joshua, alex, dax, bryan, zak, ed and manager. Assign each user this password: 123@iMs. (b) Add the groups to your system: sales with GID: 1000, HR with GID: 1100 and web with GID: 1200. (c) Add Joshua and alex to the sales group, dax and bryan to the HR group, zak and ed to the web group and add manager to all of these groups. (d) Login with each user & verify using id command that they are in the appropriate groups.	2	2
5	Use ACL to accomplish these tasks: (a) Create groups named Admin and Web. (b) Create users named John and Jimmy. (c) Create a new directory named /depts/tech/. Change the permission so that root is the owner and Admin is the group owner. (d) Use ACL to give full permission for /depts/tech/ to the Web group. (e) Allow John read/execute but not write permission on the /depts/tech/ directory. (f) Allow Jimmy full permission on the /depts/tech/ directory.	2	2
6	You are tasked with finding all SUID & SGID files under the / directories.	2	2

7	Configure your system that boots to run level 3 by default. Configure X server using command in run level 3.	2	
8	Devise a ps command that does the following. (Hint: sort/ps/top) (a) List all processes. (b) For each process, prints the information which displays the percentage of CPU usage, the process ID & name of the command that created it. (c) The output is sorted by the %cpu value from highest to lowest	2	2
9	Explain the suid, sgid & sticky bit permission with example	2	3
10	Customize the Bash prompt as per given tasks (Hint - PS1) (a) Display the current value of primary prompt string. (b) Changes prompt to print a static string "ITIMS -". (c) Restore the original prompt. (d) Insert the bash history prompt special character "\!" between the hostname and dollar-sign.	2	3
11	Configure given tasks for package management: (Hint: use rpm command) (a) Check whether ftp package is installed or not. (b) If it is not installed, install it & verify it. (c) Display the configuration files available through this package. (d) Be sure that ftp service must be enabled at startup.	2	4
12	Use rpm queries to answer the following questions. (a) What files are in the "initscripts" package? (b) Which installed packages have "gnome" in their names (c) Which RPM provides /etc/inittab?	2	5
13	Prepare a cron job that take the backup of /home at 5:00pm on every Saturday.	2	5

Reference Books:

Orsaria, Jang, "RHCSA/RHCE Red Hat Linux Certification Study Guide Exams EX200 & EX300", McGraw-Hill Education, July 2017.

Sander Van Vugt, "Red Hat RHCSA/RHCE 7 Cert Guide: Red Hat Enterprise Linux 7 (EX200 and EX300)", Phi Learning Pvt Ltd, 2009.

e-Learning Source:

https://nptel.ac.in/courses/117106113

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO3	3	3	2	2	2							3	2	2	1
CO4	3	2	3	2	2							2	2	2	2
CO5	3	2	2	2	1							3	2	2	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Effective from Session: 2020-21									
Course Code	CS-481	**Title of the Course**	IT Infrastructure Library			**L**	**T**	**P**	**C**
Year	IV	**Semester**	VIII			2	1	0	3
Pre-Requisite	None	**Co-requisite**	None						
Course Objectives									

Course Outcomes	
CO1	Create IT Service Management, Technology and Architecture
CO2	Update service Catalog Process
CO3	Analyze lifecycle Stage and Service Asset
CO4	Update operations Management Function Service Operation Processes
CO5	Understand standards and quality systems Continual Service Improvement processes

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**ITIL Overview and Service Strategy**	ITIL History, Components of the ITIL Library, IT Service Management, Organizing for IT Service Management, Technology and Architecture, Overview of HPSM and OTRS as service management tool, Service Strategy: Service Strategy Lifecycle Stage, Service Portfolio Management, the Demand Management Process, the IT Financial Management Process, Introduction to ISO 20000 Standards	7	1
2	**Service Design**	Service Design Lifecycle Stage, The Service Catalog Management Process, The Service Level Management Process, The Availability Management Process, The Capacity Management Process, The Information Security, Management Process, The IT Service Continuity, Management Process, The Supplier Management Process	7	2
3	**Service Transition**	Service Transition Lifecycle Stage, the Change Management Process, the Release and Deployment Management Process, the Service Asset and Configuration Management Process, Knowledge Management	6	3
4	**Service Operation, Continual Service Improvement**	Service Operation Functions: Service Operation Lifecycle Stage, The Service Desk Function, The Technical Management Function, The Application Management Function, The IT Operations Management Function Service Operation Processes: The Event Management Process, The Incident Management Process, The Request Full fillment Process, The Access Management Process, The Problem Management Process	8	4
5	**Continual Service Improvement**	Continual Service Improvement principles - CSI and organizational change,Ownership, Role definitions , External and internal drivers , Service Level Management , The Deming Cycle, Service measurement ,Knowledge Management, Benchmarks , Governance ,Frameworks, models, standards and quality systems Continual Service Improvement processes : 7step improvement process, Service reporting, Service management, return on in investment for CSI, business questions for CSI, Service level management	7	5

Reference Books:

Introduction to ITIL, Jan van Bon Stationery Office Books, The Stationery Office, 2010

HP operation Manual from HP, 2010

A Guide to Service Desk Concepts Donna Knapp From Cengage Learning, 2010

Service automation and dynamic provisioning techniques in IP/MPLS environments - Christian Jacquenet, Gilles Bourdon, Mohamed Boucadair John Wiley and Sons, 2008

The Shortcut Guide to Virtualization and Service Automation, Greg Shield Real-time Publishers, 2008

e-Learning Source:

https://in.coursera.org/lecture/cybersecurity-roles-processes-operating-system-security/information-technology-infrastructure-library-itil-overview-GupvE

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1								3	1	2	1
CO2	3	3	3	2	1	1						3	2	1	1
CO3	3	3	2	1		1						3	1	1	
CO4	3	2	3	2	2	1						2	2		1
CO5	3	2	2	2	2	1						2	2		1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation