# Medi-Caps University
## Faculty of Engineering

Scheme for M.Tech. (CS)

**Batch 2018**
Scheme for M.Tech. (CS)
Specialization in Cloud Computing

## M.Tech - SEMESTER I [Batch 2018]

| Sr.No | Subject Code | Courses | L | T | P | Hrs. | Credits |
|---|---|---|---|---|---|---|---|
| 1 | CS5BS01 | Mathematics | 4 | 0 | 0 | 4 | 4 |
| 2 | CS5CC09 | Cloud Architecture | 4 | 0 | 4 | 8 | 6 |
| 3 | CS5CC10 | Big Data Analysis | 4 | 0 | 4 | 8 | 6 |
| 4 | CS5EL14 | Elective I: Data Center Networking | 4 | 0 | 0 | 4 | 4 |
| 5 | EN5MC01 | Value and Ethics | 2 | 0 | 0 | 2 | 0 |
| 6 | EN5RD01 | Research Methodology | 4 | 0 | 0 | 4 | 4 |
| | | Total | 22 | 0 | 8 | 30 | 24 |

## M.Tech - SEMESTER II [Batch 2018]

Specialization : Cloud Computing

| Sr. No. | Subject Code | Courses | L | T | P | Hrs. | Credits |
|---|---|---|---|---|---|---|---|
| 1 | CS5CC11 | Cloud Application Development | 4 | 0 | 4 | 8 | 6 |
| 2 | CS5CC12 | Data Center Virtualization | 4 | 0 | 4 | 8 | 6 |
| 3 | CS5EL12 | Elective –II: Cloud Security | 4 | 0 | 0 | 4 | 4 |
| 4 | CS5EL16 | Elective -III: Cloud Strategy Planning & Management | 4 | 0 | 0 | 4 | 4 |
| 5 | EN5HS01 | Entrepreneurship and Management | 3 | 0 | 0 | 3 | 3 |
| 6 | EN5HS02 | Technical Paper Writing | 0 | 0 | 2 | 2 | 1 |
| | | Total | 19 | 0 | 10 | 29 | 24 |

**M TECH (CS) SEMESTER – III Sem [Batch 2018]**

| Sr. No. | Subject Code | Courses | L | T | P | Hrs. | Credits |
|---------|--------------|---------|---|---|---|------|---------|
| 1 | CS5PC01 | Dissertation Phase-I | 0 | 0 | 0 | 0 | 18 |
| | | Total | 0 | 0 | 0 | 0 | 18 |

**M TECH (CS) SEMESTER – IV Sem [Batch 2018]**

| Sr. No. | Subject Code | Courses | L | T | P | Hrs. | Credits |
|---------|--------------|---------|---|---|---|------|---------|
| 1 | CS5PC02 | Dissertation Phase-II | 0 | 0 | 0 | 0 | 24 |
| | | Total | 0 | 0 | 0 | 0 | 24 |

Syllabus

| Course Code | Course Name | Hours per Week | | | Total | |
|---|---|---|---|---|---|---|
| | | L | T | P | Hrs. | Credits |
| CS5BS01/IT5BS01 | Mathematics | 4 | 0 | 0 | 4 | 4 |

MTECH/CSE/2018/2019

**Course Objectives:**

1. To equip with the fundamental concepts in vector spaces.

2. To understand and to distinguish different types of logic.

3. To understand the concept of Random variables, Stochastic processes.

4. To equip with the fundamental concepts in graph.

5. To equip with the fundamental concepts in Number theory. .

**Prerequisites:** Nil

**Co-requisites:** Basic mathematical Skills

**Curriculum:**

**UNIT – I**

**Linear Algebra**

Vector spaces, subspaces, Sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis , Linear transformations and their representation as matrices, the algebra of linear Transformations, The rank- nullity theorem. Change of Basis, Orthogonality, Eigen value analysis.

**UNIT-II**

**Logics and Fuzzy Set Theory**

Propositional logic, Truth tables, Tautologies, Resolution proof system, Predicate logic, Temporal logic. Fuzzy : Introduction to Fuzzy Sets – Basic Definition and Terminology – Set-theoretic operations – Member Function Formulation and parameterization – Fuzzy Rules and Fuzzy Reasoning - Extension principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning and Introduction defuzzification technique.

## UNIT-III

### Random Variables and Stochastic Processes

Random variables, Stochastic processes, Markov process, Markov chain, transition probability transition probability matrix, transient and steady state, Queuing system traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS).

## UNIT-IV

### Graph Theory

Basic definitions of Graphs, connectivity of a graph, cut points, cycles Hamiltonian graphs, sub graphs, spanning sub graphs, isomorphic graphs, matrix representation of graphs, Bipartite graphs, Tree, different characterization of trees Algorithms on graphs, BFS, DFS Dijkstra's algorithm for shortest path, Floyd's algorithm for all pairs of shortest paths, Kruskal's and Prim's algorithm for minimum spanning tree.

## UNIT-V

### Number Theory

Introduction to Number theory: Divisibility, modular arithmetic (addition modulo and multiplication modulo); Statements and applications of Euler and Fermat Theorems, Primitive Roots, Discrete Logarithms, Primality Test, Finding Large primes.

**Case Studies:**

Not Applicable.

**List of Practicals:**

Not Applicable.

**Project:**

Optional.

**Course Outcomes:**

After completion of the course, the student will be able to

1. Students will be well equipped with the fundamental knowledge of Vector spaces, subspaces,Linear span, Linear dependence, independence and their basic properties.

2. Students will be able to use propositional and fuzzy logic.

3. Students will be able to use queuing models in real life problem.

4. Students will get exposed to the different types Fourier transform and their properties.

5. Student will be able to find divisibility, modular arithmetic and Large primes.

**TEXT BOOKS**
1. Narishng Deo, *Graph Theory with application to Engineering and Computer Science PHI.*
2. Ernest Davis,*Linear Algebra and Probability for Computer Science Applications (1st Ed): CRC Press.*
3. *R.Pugalarasu ,Probability and Random Processes,Tata McGraw Hills private Ltd.*
4. George J. Klir, *Fuzzy Sets And Fuzzy Logic: Theory And Applications,Pearson Education.*
5. *David M Burton "Elementary Number Theory" Tata McGraw Hills private Ltd.*

**REFERENCES BOOKS**

1. **Mordeson**, John N., Premchand S. Nair, *Fuzzy Mathematics, An Introduction for Engineers and Scientist, Physica-Verlag Heidelberg, Springer-Verlag Berlin Heidelberg*

2. A.K. Sharma, *Linear Algebra, Discovery Publishing House,*

3. Shrinivasan Keshav, *Mathematical Foundation of computer networking,Pearson Eduaction,*

**Web Source:**

1. *nptel.ac.in/courses/111106051/*

2. *nptel.ac.in/courses/111102014/*

**Open Learning Source:**

1. *https://swayam.gov.in/courses/public*
2. *http://nptel.ac.in/course.php*

| Course Code | Course Name | Hours per Week | | | Total Hrs. | Total Credits |
|---|---|---|---|---|---|---|
| | | L | T | P | | |
| CS5CC09 | Cloud Architecture | 4 | 0 | 4 | 8 | 6 |

**Unit I: Cloud Computing Fundamentals**

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

**Unit II: Cloud Applications**

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.

**Unit III: Management of Cloud Services**

Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services. Economics of choosing a Cloud platform for an organization, based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat).

**Unit IV: Application Development**

Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

**Unit V: Cloud IT Model**

Analysis of Case Studies when deciding to adopt cloud computing architecture. How to decide if the cloud is right for your requirements. Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO)

**Text Books:**

1. Gautam Shroff, "Enterprise Cloud Computing Technology Architecture Applications", Cambridge University Press.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach" McGraw-Hill Osborne Media.

**References:**

1. Dimitris N. Chorafas, "Cloud Computing Strategies" CRC Press.
2. EMC, "Information Storage and Management" Wiley

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| **CS5CC10** | **Big Data Analysis** | 4 | 0 | 4 | 8 | 6 |

**Unit I: Introduction to Big Data**
Analytics –Nuances of big data –Value –Issues –Case for Big data – Big data options Team challenge –Big data sources –Acquisition –Nuts and Bolts of Big data. Features of Big Data Security, Compliance, auditing and protection -Evolution of Big data –Best Practices for Big data Analytics -Big data characteristics -Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools –Greenplum –Informatica.

**Unit-II: Data Analysis**
Evolution of analytic scalability –Convergence –parallel processing systems – Cloud computing –grid computing –map reduce –enterprise analytic sand box –analytic data sets
–Analytic methods –analytic tools –Cognos –Microstrategy -Pentaho. Analysis approaches – Statistical significance –business approaches –Analytic innovation –Traditional approaches – Iterative

**Unit-III: Stream Computing**
Introduction to Streams Concepts –Stream data model and architecture - Stream Computing, Sampling data in a stream –Filtering streams –Counting distinct elements in a stream Estimating moments –Counting oneness in a window –Decaying window -Realtime Analytics Platform (RTAP) applications IBM Infosphere –Big data at rest –Infosphere streams – Data stage – Statistical analysis –Intelligent scheduler –Infosphere Streams

**Unit- IV: Predictive Analytics and Visualization**
Predictive Analytics –Supervised –Unsupervised learning –Neural networks –Kohonen models – Normal –Deviations from normal patterns – Normal behaviours –Expert options –Variable entry -Mining Frequent itemsets -Market based model –Apriori Algorithm –Handling large data sets in Main memory –Limited Pass algorithm – Counting frequent itemsets in a stream –Clustering Techniques –Hierarchical –K-Means – Clustering high dimensional data Visualizations -Visual data analysis techniques, interaction techniques; Systems and applications

**Unit-V: Frameworks and Applications**
IBM for Big Data –Map Reduce Framework -Hadoop –Hive -– Sharding –NoSQL Databases - S3 -Hadoop Distributed file systems –Hbase –Impala –Analyzing big data with twitter –Big data for E-Commerce –Big data for blogs.

**Text Books:**

1. Frank J Ohlhorst, Big Data Analytics: Turning Big Data into Big Money, Wiley and SAS Business Series.
2. Colleen Mccue, Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis, Elsevier.

**References**

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press.
3. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley and SAS Business Series.
4. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill.
5. Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, "Harness the Power of Big data –The big data platform, McGraw Hill.
6. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons.
7. Pete Warden, Big Data Glossary, O'Reilly.
8. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier.

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| **CS5EL14** | **Data Center Networking** | 4 | 0 | 0 | 4 | 4 |

## Unit I: Evolution of Data Centre Design

Design for flexibility, scalability, environmental control, electrical power, flooring, fire protection, security, network infrastructure. Energy use and greenhouse gas emissions. Requirements for modern data centers, high availability and Service Orientated Infrastructures (SOI). Modern data centre use case studies.

## Unit II: Data Centre Architectures

Network connectivity optimization evolution: Top of rack (TOR), end of rack (EOR), scale up vs scale up, solutions that reduce power and cabling. Data Centre standards; TIA/EIA-942. Structured cabling standards, fibre and copper cabling characteristics, cable management, bandwidth requirements, I/O connectivity.

## Unit III: Server Architectures

Stand-alone, blades, stateless, clustering, scaling, optimization, virtualization. Limitation of traditional server deployments; modern solutions. Applications; database, finance etc. Redundant Layer 2 and Layer 3 designs. Case studies.

## Unit IV: Layer 2 Networks

Ethernet; IEEE 802.3ba; 40 Gbps and 100 Gbps Ethernet. IEEE 802.1D Spanning Tree Protocol (STP), RSTP, PVST, MSTP. TRILL (Transparent Interconnection of Lots of Links), RBridges, IEEE 802.1Qbg Edge Virtual Bridging, 802.1Qbh Bridge Port Extension. Fibre Channel over Ethernet (FCoE) vs Internet Small Computer System Interface (iSCSI). Data Center Bridging (DCB); priority-based flow control, congestion notification, enhanced transmission selection, Data Center Bridging Exchange (DCBX). Layer 2 Multicasting; Case studies.

## Unit V: Layer 3 And Beyond

Layer 3 Data Centre technologies, network virtualization. Protocols; IPv4, IPv6, MPLS, OSPF, IS-IS, BGP. OTV, VPLS layer 2 extension protocols. Locator Identifier Separation Protocol (LISP). Layer 3 Multicasting. Data centre application services. Data centre networking use case studies and the enabling technologies and protocols in the modern data centre.

## Text Books:

1. SilvanoGai, Claudio DeSanti,"I/O Consolidation in the Data Center" Cisco Press; 1 edition [ISBN: 9781587058882]. 2009.

2. Kevin Corbin, Ron Fuller, David Jansen, "NX-OS and Cisco Nexus Switching: Next-Generation Data Center Architectures" Cisco Press; 1 edition [ISBN: 9781587058929], 2010.

**References:**

1. SilvanoGai, TommiSalli, Roger Andersson, "Cisco Unified Computing System" Cisco Press.
2. Nash Darukhanawalla, Patrice Bellagamba, "Interconnecting Data Centers Using VPLS" Cisco Press.
3. Robert W. Kembel, Roger Cummings (Introduction), "The Fibre Channel Consultant" Northwest Learning Assoc.
4. Robert W Kembal"Fiber Channel Switched Fabric" Northwest Learning Associates, inc.
5. John L. Hufferd, "ISCSI", Addison-Wesley Boston.

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| **EN5MC01** | **Value and Ethics** | **2** | 0 | **0** | 2 | 0 |

## UNIT-I

HUMAN VALUES :Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence – Character.

## UNIT-II

ENGINEERING ETHICS: Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories. Valuing Time – Co-operation – Commitment –

## UNIT-III

ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

## UNIT-IV

SAFETY, RESPONSIBILITIES AND RIGHTS: Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies.

## UNIT-V

GLOBAL ISSUES: Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors - moral leadership-

**Text Books:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.

2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

**References :**

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall.
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning.

3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press.

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| EN5RD01 | **Research Methodology** | 4 | 0 | 0 | 4 | 4 |

## Unit-I: Introduction to Research Techniques

Meaning of research, objectives of research, motivation in research, types of research- empirical and experimental research, algorithmic research, simulation research, mathematical modelling approach, characteristics and prerequisites of research, significance of research, research process, Sources of research problem, criteria of identifying the problem, necessity of defining the problem, formulation of a research problem, errors in selecting research problem, technique involved in defining the problem, Report and paper writing.

## Unit-II: Statistical analysis

Statistical analysis, Measures of central tendency and dispersion, mean, median, mode, range, mean and standard deviations, computing correlation in variables, linear and non-linear regression.

## Unit-III: Probability and Probability distributions

*Probability:* classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes'Theorem and independence. Probability distributions: binomial, poison, geometric, negative binomial uniform exponential, normal and log normal distribution.

*Random Variables:* Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, probability and moment generating function, median and quintiles, Markov inequality, correlation and regression, independence of random variables.

## Unit-IV: Sampling & Distributions

The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, ChiSquare, t and F distributions, problems. Hypothesis Testing: Basic ideas of testing hypothesis, null and alternative hypotheses, the critical and acceptance regions, two types of error, tests for one sample and two sample problems for normal populations, tests for proportions, Chi-square goodness of fit test and its applications. Software and Tools to be learnt: Statistical packages like SPSS and R.

## Unit-V: Simulation and Soft Computing Techniques

Introduction to soft computing, Artificial neural network, Genetic algorithm, Fuzzy logic and their applications, Tools of soft computing, Need for simulation, types of simulation, simulation language, fitting the problem to simulation study, simulation models, verification of simulation models, calibration

and validation of models, Output analysis. Introduction to any one simulation tool e.g. MATLAB, NS2, ANSYS, Cadence etc. (Department Specific).

**Text Books:**
1. R. Panneerselvam, Research Methodologies, PHI.
2. C.R. Kothari: Research methodology, Methods and Techniques, New Age Publication.
3. S.M. Ross, A First Course in Probability, Prentice Hall.

**References:**
1. Best John V. and James V Kahn: Research in Education, Wiley eastern.
2. S.P. Sukhia, P.V. Mehrotra, and R.N. Mehrotra: Elements of Educational Research, PHI publication.
3. K. Setia, Methodology of Research Education, IEEE publication.
4. Jerry Banks, John S. Carson, Barry.L. Nelson David. M. Nicol, Discrete-Event System Simulation, Prentice-Hall India.
5. V.K. Rohatgi, A.K. Md.E.Saleh, An Introduction to Probability and Statistics, John Willey.

| Course Code | Course Name | Hours per Week | | | Total Hrs. | Total Credits |
|---|---|---|---|---|---|---|
| | | L | T | P | | |
| CS5CC11 | **Cloud Application Development** | 4 | 0 | 4 | 8 | 6 |

Mtech/ CSE/ 2018

**Unit I: Cloud Based Applications**
Introduction, Contrast traditional software development and development for the cloud, Public, private & hybrid cloud apps, Understanding Cloud ecosystems – SaaS/PaaS/IaaS.

**Unit II: Designing Code for the Cloud**
Analysis and Design Methodology for Cloud applications; Web Browsers – Architecture and Components. Building blocks of the presentation layer: HTML, HTML5, CSS, XML.

**Unit III:  Understanding the Cloud Development Ecosystem**
Identity management, Compute infrastructure, Storage & database management, Imaging: VM images and its migration, Dashboard control, Networking specific to cloud application development.

**Unit IV: Building Cloud Based Application**
Converting a Legacy App to cloud application, Building Cloud Application from Scratch, Cloud Application Deployment Strategies.

**Unit V: Managing and Improving an Application in the Cloud**
Orchestration and Configuration Management, Monitoring and Metering, Updating and Patching. Failure Scenarios, Scaling, Improving cloud application.

**Text Books:**
1. Scott Adkins, "Openstack Cloud Application Development" Wrox publication.
2. George Reese, "Cloud application architectures", O'Reilly Sebastopol.

**References:**
1. Eugene Ciurana, "Developing with Google App Engine" Apress;
2. Charles Severance, "Using Google App Engine" O'Reilly Media.
3. Chris Hay, Brian Prince, "Azure in Action" Manning Publications.
4. Henry Li, "Introducing Windows Azure" Apress.
5.  Dan Sanderson, "Programming Google App Engine" O'Reilly Media.

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hrs. | Credits |
| **CS5CC12** | **Data Center Virtualization** | **4** | **0** | **4** | **8** | **6** |

### Unit I: Data Center Challenges

How server, desktop, network Virtualization and cloud computing reduce data center footprint, environmental impact and power requirements by driving server consolidation; Evolution of Data Centers: The evolution of computing infrastructures and architectures from standalone servers to rack optimized blade servers and unified computing systems (UCS).

### Unit II: Enterprise-Level Virtualization

Provision, monitoring and management of a virtual datacenter and multiple enterprise-level virtual servers and virtual machines through software management interfaces; Networking and Storage in Enterprise Virtualized Environments - Connectivity to storage area and IP networks from within virtualized environments using industry standard protocols.

### Unit III: Virtual Machines & Access Control

Virtual machine deployment, modification, management; monitoring and migration methodologies: Lift and Shift, Refactoring , Modernization. Risks in cloud migration, Risk mitigation plan

### Unit IV: Resource Monitoring

Memory optimization: Ballooning, memory compression, host swapping techniques for memory reclamation, CPU management and abstraction techniques using a hypervisor, CPU scheduler operation. Network Optimization, Storage Optimization.

### Unit V: Virtual Machine Data Protection

Backup and recovery of virtual machines using data recovery techniques ,Scalability - Scalability features within Enterprise virtualized environments using advanced management applications that enable clustering, distributed network switches for clustering, network and storage expansion; High Availability : Virtualization high availability and redundancy techniques.

**Text Books:**

1. Mickey Iqbal, "IT Virtualization Best Practices: A Lean, Green Virtualized Data Center Approach", MC Press [ISBN: 978-1583473542] 2010.
2. Mike Laverick, "VMware vSphere 4 Implementation" Tata McGraw-Hill Osborne Media; 1 edition [ISBN: 978-0071664523], 2010.

**References:**

1. Jason W. McCarty, Scott Lowe, Matthew K. Johnson, "VMware vSphere 4 Administration Instant Reference" Sybex.
2. Brian Perry, Chris Huss, Jeantet Fields, "VCP VMware Certified Professional on vSphere 4 Study Guide" Sybex.

| Course Code | Course Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| CS5EL12 | Cloud Security | 4 | 0 | 0 | 4 | 4 |

**Unit- I : Security Concepts**
Confidentiality, privacy, integrity, authentication, non-repudiation, availability, access control, defense in depth, least privilege, how these concepts apply in the cloud, what these concepts mean and their importance in PaaS, IaaS and SaaS.e.g. User authentication in the cloud; Cryptographic Systems-Symmetric cryptography, stream ciphers, block ciphers, modes of operation, public-key cryptography, hashing, digital signatures,

**Unit-II: Security Fundamentals and Risk Issues in the Cloud**
Cloud Information Security Objectives, Cloud Security services, Cloud Security Design Principles, Secure Cloud Software Requirements, Security Policy Implementation and decomposition, Cloud Computing and Business Continuity/Disaster Recovery, CIA triad, Privacy and compliance risk. **Infrastructure Security:** Infrastructure Security: The Network Level, Infrastructure Security: The Host Level, Infrastructure Security: The Application Level. **Data Security and Storage:** Aspects of Data Security, Data Security Mitigation, Provider Data and Its Security.

**Unit- III: Identity and Access Management**
Introduction**,** Definitions, Trust Boundaries, Challenges, Architecture and Practices, Getting Ready for the Cloud, Relevant IAM Standards and Protocols for Cloud Services, Cloud Authorization Management, Cloud Service Provider IAM Practice.

**Unit-IV: Security Management in the Cloud**
 Security Management Standards, Security Management, Availability Management, SaaS Availability Management, PaaS Availability Management, IaaS Availability Management, Access Control, Security Vulnerability, Patch, and Configuration Management.

**Unit- V: Legal and Compliance Issues**
Responsibility, ownership of data, right to penetration test, local law where data is held, examination of modern Security Standards (eg.PCIDSS), how standards deal with cloud services and virtualization, compliance for the cloud provider vs. compliance for the customer.

**Text Books**
1. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy, O'Reilly.
2. Raghu Yeluri, Enrique Castro-Leon, Building the Infrastructure for Cloud Security A Solutions view, Apress open.
3. Ronald L. Krutz, Russell Dean Vines, Cloud Security A Comprehensive Guide to Secure Cloud Computing, Wiley.

**References**
1. John Rittinghouse, James Ransome, Cloud Computing, *CRC* Press.
2. J.R. ("Vic") Winkler, Securing the Cloud, Syngress.
3. Cloud Security Alliance, Security Guidance for Critical Areas of Focus in Cloud Computing, 2009.
4. Vmware, VMware Security Hardening Guide, White Paper, June 2011 .
5. Cloud Security Alliance 2010, Top Threats to Cloud Computing, Microsoft2013.

| Course Code | Course Name | Hours per Week | | | Total | Total |
| | | L | T | P | Hrs. | Credits |
| --- | --- | --- | --- | --- | --- | --- |
| **CS5EL16** | **Cloud Strategy Planning & Management** | **4** | **0** | **0** | **4** | **4** |

### Unit I: Achieving Business Value from IT Transformation

Moving to a cloud architecture and strategy to achieve business value. BPM, IS, Porter's Value chain model and BPR as a means of delivering business value; Developing Business Strategy: Investigate business strategy models to gain competitive advantage for organizations, SWOT/PEST, Economies of scale, Porter's 3 Strategies and 5 Competitive Forces, D'Aveni's hyper competition models.

### Unit II: Strategic IT Leadership in the Organization

Emphasize the roles of the strategic IS/IT leaders such as Chief Information Officer (CIO) and the Chief Technology Officer (CTO) in planning and managing IT Strategic development in the organization.

### Unit III: Planning A Cloud Computing Based IT Strategy

Develop an IT strategy to deliver on strategic business objectives in the business strategy. IT Project planning in the areas of ITaaS, SaaS, PaaS and IaaS are essential in delivering a successful strategic IT Plan.

### Unit IV: SOA and Business Agility

Shared services delivered by a Service Oriented Architecture (SOA) in a Private or Public Cloud. Services, Databases and Applications on demand. The effect on Enterprise Architecture and its traditional frameworks such as Zachman and The Open Group Architecture Framework (TOGAF).

### Unit V: Benefit Realization and IT Governance

Managing resources (people, process, technology), to realize benefit from Private/Public Cloud IT services (IaaS, PaaS, PraaS, SaaS), Gartner's 5 pillars of benefit realization. IT governance as a service in measuring the delivery of IT Strategy from Cloud IT Services using Sarbannes Oxley (CobiT) and other commonly-used approaches.

### Text Books:

1. Charles Babcock, "Management Strategies for the Cloud Revolution", Tata McGraw/Hill
2. David S. Linthicum, "Cloud Computing and SOA Convergence in Your Enterprise", Addison Wesley.

### References:

1. Andy Mulholland, Jon Pyke, Peter Finger, "Enterprise Cloud Computing - A Strategy Guide for Business and Technology Leaders", Meghan Kiffer.
2. Mark I. Williams, "A Quick Start Guide to Cloud Computing: Moving Your Business into the Cloud" Kogan Page.

| Subject Code | Subject Name | Hours per Week | | | Total | Total |
|---|---|---|---|---|---|---|
| | | L | T | P | Hr | Credit |
| EN5HS01 | **Entrepreneurship and Management** | 3 | 0 | 0 | 3 | 3 |

**Course Objectives**
1. To Institute Entrepreneurship Skills in the Students
2. To inculcate the spirit and perspective of entrepreneurship among students
3. To make the students job creators instead of job seekers.
4. To enable the students to manage the business and organizations.
5. To use concepts of management, organization structure dynamics effectively to achieve organizational goals.

**Course Outcomes:**
On successful completion of this course students will have a better understanding on fundamentals of different business opportunities and strategies required to make it successful.

**Course Contents:**

**Unit-I: Introduction to Entrepreneurship**
Definition and Meaning, Concept and Need of Entrepreneurship; Role of entrepreneurship in Economic Development; Factor Affecting
Entrepreneurial Growth – Economic, Non-Economic Factors, Managerial vs. entrepreneurial approach, Entrepreneur vs. Intrapreneur, Types of Entrepreneurs, Traits/Qualities of an Entrepreneurs, Characteristic of successful entrepreneurs, Entrepreneurship process, Women as Entrepreneurs, Ethics and Social Responsibilities; Entrepreneurial challenges.

**Unit-II: Creating and Starting the Venture**
Business plan– Meaning, Significance, contents, formulation and presentation of Business Plan, implementing business plans. Marketing plan, financial plan and the organizational plan, Launching Formalities, Common errors in Business Plan formulation.

**Unit: III- Innovation and Entrepreneurship**
Entrepreneurship and Innovation The Innovation Concept, Importance of Innovation for Entrepreneurship, Source of Innovation for Opportunities, The Innovation Process, Product life cycle, new product development process, Creativity and innovation in product modification/ development.

**Unit-IV: Introduction to Management and Organization**
Concept and differences between industry, commerce and business. Various types of ownership in the organization– Definition, Characteristics, Merits & Demerits, Single ownership, Partnership, Cooperative Organizations, Joint Stock Companies, Government owned. Difference between management and administration. Management as a science and as an art, different types of leadership

models-Autocratic Leader, Democratic Leader, Free Rein Leader ,Freelance Leader.

**Unit–V:Functions of Management**
Planning: Definition, Types of Planning, Steps in planning process. Nature and Purpose of Organizing: Staffing, Line and Staff Relationship, Line-Staff Conflict, Directing: definition and importance, Controlling: Concept and Process of Control, Control Techniques, Control as a Feedback System,

**Text Books**
1. Rajeev Roy, Entrepreneurship, Oxford University press.
2. Stephen P. Robbins, David A. Decenzo, Sanghmitra Bhattacharya,  Madhushree Nanda Agarwal, Fundamentals of Management, Pearson Education.
3. Robbins, Management, Pearson Education.
4. Harold Koontz, O'Donnell, Heinz Weihrich, Essentials of Management**.** Tata McGraw Hill.
5. Stoner, *Management*, PHI Learning.
6. Vasant Desai, Small scale Industries and Entrepreneurship, Himalaya Publishing House.
7.  Gupta C.B. Khanks S.S., Entrepreneurship and Small Business Management, Sultan Chand & Sons, New Delhi.

**References**
1. Greene, Entrepreneurship, Cengage learning.
2. B. K. Mohanty Fundamentals of Entrepreneurship PHI.
3. Barringer, Entrepreneurship Pearson education.
4. Desai Vasant, Dynamics of Entrepreneurship Development and Management, Himalaya Publishing House
5. David H Holt Entrepreneurship: New Venture Creation, PHI.
6. Satyaraju, Parthsarthy**,** Management Text and Cases, PHI Learning.
7. Kanishka Bedi, Management and Enterpreneurship, Oxford Higher Education.

| Subject Code | Subject Name | Hours per Week | | | Total Hr | Total Credit |
|---|---|---|---|---|---|---|
| | | L | T | P | | |
| **EN5HS02** | **Technical Paper Writing** | **0** | **0** | **2** | **2** | **1** |

- Report writing, various formats
- Plagiarism
- How to make a synopsis
- Reading techniques
- Making a hypothesis
- Writing abstract and Summary
- Paraphrasing
- Building thoughts
- Chapterization
- Formatting
- Oral presentation
- How to make good ppts
- Viva voce/ interviews
- Importance of syntax and semantics, Mechanics of writing, Proof reading

**Text Books:**
1. C.R Kothari. Research Methodology. Sultan Chand & Sons, New Delhi.
2. Day R A. How to Write and Publish a Scientific Paper. Cambridge University Press.
3. Sharma RC and Krishna Mohan, Business correspondence and report writing, Tata Mc Graw Hill.
4. Murphy Herta A, Herberrt W Hildebrandt, Jane P Thomas. Effective Business Communication. Tata Mc Graw Hill.
5. Rizvi Ashraf. *Effective Technical Communication*. Tata Mc Graw Hill.
6. Koneru Aruna. Professional Communication, McGraw Hill.