

Skill Enhancement Course from the department for pool of the Courses in the University

(These courses are offered by each department for students of other departments/same department and is designed to provide value-based and/or skill-based knowledge and should contain both theory and lab/hands-on/training/field work.)

Semester 1

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-1	Problem solving and python programming	242/MCA/SE101	2	-	2	2	-	1	3	15	35	5	20	75

Semester 2

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-2	Numerical Ability and Enhancement Skills	242/MCA/SE201	2	-	2	2	-	1	3	15	35	5	20	75

Semester 3

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-3	Basic Statistics Tool	242/MCA/SE301	2	-	2	2	-	1	3	15	35	5	20	75

Semester 5

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-4	Summer Internship Report-I	242/MCA/SE501	-	-	8	-	-	4	4	-	-	30	70	100

Semester 6

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-5	Presentation Skills and Personality	242/MCA/SE601	1	-	2	1	-	1	2	5	20	5	20	50

Semester 9

Course Code	Course Title	Course ID	L	T	P	L	T	P	Credits	MARKS				
			(Hrs)			Credits				TI	TE	PI	PE	Total
SEC-6	Cloud Computing Essentials	242/MCA/SE901	2	-	-	2	-	-	2	15	35			50

Course code				
Category	SEC			
Course title	Numerical Ability and Enhancement Skills			
Scheme and Credits	L	T	P	Credits
	2		1	3
Class work	15			
Exam	35			
PI	5			
PE	20			
Duration of Exam				

NOTE: “The examiner will set nine questions in total. Question one will have seven parts from all units and the marks of first question will be of 20% of total marks of Question Paper and the remaining eight questions to be set by taking two questions from each unit and the marks of each question from Question no.2 to 9 will be of 20% of total marks of Question paper . The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.”

Unit I:

Probability theory 23 23 Probability, conditional probability and independence; Random variables and their distributions (discrete and continuous), bivariate and multivariate distributions; Laws of large numbers, central **limit theorem (statement and use only)**.

Unit II:

Stochastic process Definition and examples of stochastic processes, weak and strong stationarity; Markov chains with finite and countable state spaces – classification of states,

Unit III:

Processes Markov processes, Poisson processes, birth and death processes, branching processes, queuing processes.

Unit IV:

Selected applications Analysis of algorithms, performance evaluation and modeling of computer systems.

References

1. W. Feller, An Introduction to Probability Theory and its Applications (Volume I and II), 3E, Wiley, 1973.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, University Book Stall/Houghton Mifflin, New Delhi/New York, 1998/1971.
3. K. L. Chung, Elementary Probability Theory and Stochastic Processes, SpringerVerlag, 1974.
4. S. M. Ross, Stochastic Processes, John Wiley, New York, 1983.
5. H. M. Taylor, First Course in Stochastic Processes, 2nd ed. Academic Press, Boston, 1975.

Course code				
Category	SEC			
Course title	Basic Statistics Tool			
Scheme and Credits	L	T	P	Credits
	2		1	3
Class work	15			
Exam	35			
PI	15			
PE	35			
Duration of Exam	3 HRS			

Unit-I

Descriptive Statistics: Concept of primary and secondary data, Classification of data, Measures of central tendency (Arithmetic mean, median, mode, geometric mean and harmonic mean) with simple applications, Absolute and relative measures of dispersion (range, quartile deviation, mean deviation, standard deviation and variance) with simple applications. Importance of moments, central and non-central moments, their inter-relationships, Sheppard's correction for moments for grouped data, Measures of skewness based on quartiles and moments, kurtosis based on moments with real life examples.

Unit-II

Probability: Basic concepts of probability, deterministic and random experiments, trial, outcome, sample space, event, operations of events, mutually exclusive and exhaustive events, equally likely and favorable events with examples, Mathematical, Statistical and Axiomatic definitions of probability, their merits and demerits. Properties of probability based on axiomatic definition. Conditional probability and independence of events, Addition and multiplication theorems for 'n' events, Boole's inequality and Bayes' theorem, Problems on probability using counting methods and theorems.

Unit-III

Random Variables: Definition of random variable, discrete and continuous random variables, functions of random variables, probability mass function and probability density function with illustrations. Distribution function and its properties, Transformation of onedimensional random variable (simple 1-1 functions only). Notion of bivariate random variable, bivariate distribution, statements of its properties, Joint, marginal and conditional distributions, Independence of random variables.

Unit-IV

Mathematical Expectation: Mathematical expectation of a function of a random variable, Raw and central moments, covariance using mathematical expectation with examples, Addition and multiplication theorems of expectation. Chebyshev's and Cauchy-Schwartz's inequalities and their applications. Definitions of moment generating function (m.g.f), characteristic function (c.f), cumulant generating function (c.g.f), probability generating function (p.g.f) and statements of their properties with applications.

Cloud Computing Essentials

Course code	9.5			
Category	Skill Enhancement Course (SEC)			
Course title	Cloud Computing Essentials			
Scheme and Credits	L	T	P	Credits
	2	-	-	2
Theory Internal	15 Marks			
Theory External	35 Marks			
Practical Internal	-			
Practical External	-			
Total	50 Marks			
Duration of Exam	03 Hours			

Note: Examiner will be required to set NINE questions with all questions carrying equal marks. Question Number 1, covering the entire syllabus, will be compulsory. Examiner will set two questions from each Unit with internal choice. Student will be required to attempt FIVE questions in all, selection one question from every unit apart from the Question Number 1.

Course Outcomes (COs):

CO1: Identify the Parallel and Distributed computing technologies involved in Cloud.

CO2: Explain the design principles involved in building a Cloud platform over virtualized clusters and data centers

CO3: Analyze different performance metrics for evaluating Cloud Applications.

CO4: Prepare Cloud based applications that can scale out.

CO5: Apply task and data parallel distributed algorithms for Cloud.

UNIT I

Introduction of Cloud Computing: What is Cloud Computing?, How it works? Cloud Computing Delivery Models and Services, Ethical issues in Cloud Computing, Cloud Vulnerabilities, Major Challenges faced by Cloud Computing

UNIT II

Parallel and Distributed Systems:

Parallel and Distributed Systems Introduction, Parallel Computing, Architecture, Distributed Systems, Communication Protocol and Process Coordination, logical Clocks, Message Delivery Rules, Concurrency, Atomic Actions, Consensus Protocols, Modeling Concurrency with Petri Nets, Client-Server Paradigm

UNIT III

Cloud Infrastructure

Cloud Computing at Amazon, Google Perspective, Microsoft Windows Azure and Online Services, Open-Source Software Platforms for Private clouds, Intercloud, Responsibility Sharing Between User and Cloud service provider, Cloud Virtualization, Layering, Full Virtualization and Paravirtualization.

UNIT IV

Cloud Computing Services:

Standard Cloud Model, Cloud Deployment Model, Service Delivery Models, Service Abstraction, SPI Model, Traditional System vs Cloud System Model, All Applications delivered using web services are not SaaS, SaaS and PaaS: Salesforce.com and Force.com, Open Cloud Services.

TEXT AND REFERENCE BOOKS:

1. Barrie Sosinsky: "Cloud Computing Bible", Wiley-India, 2010
2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski: "Cloud Computing: Principles and Paradigms", Wiley, 2011
3. Nikos Antonopoulos, Lee Gillam: "Cloud Computing: Principles, Systems and Applications", Springer, 2012
4. Ronald L. Krutz, Russell Dean Vines: "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley-India, 2010
5. Tim Mather, Subra Kumara swamy, Shahed Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, O'Reilly Media, 2009