Open Elective Course - I

1. Cloud Computing
2. Public Policy and Governance
3. Technical answers to real world problems
4. Entrepreneurship and startup management
5. Mobile and Smart Phone Forensics
6. Cryptocurrency with Ethereum
7. Vedic Mathematics
8. Human Resource Management

CLOUD COMPUTING

Semester	V				
Course code					
Category	Open Elective				
Course title	Cloud Computing				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES

1. To provide students with the fundamentals and essentials of Cloud Computing.
2. To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
3. To enable students exploring some important cloud computing driven commercial systems and applications.
4. To expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.

COURSE OUTCOMES

CO 1	Identify the Parallel and Distributed computing technologies involved in Cloud.
CO 2	Explain the design principles involved in building a Cloud platform over virtualized clusters and data centers.
CO 3	Analyze different performance metrics for evaluating Cloud Applications.
CO 4	Prepare Cloud based applications that can scale out.
CO 5	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.

BOOKS RECOMMENDED:

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.

PUBLIC POLICY AND GOVERNANCE

Semester	V				
Course code					
Category	Open elective				
Course title	Public Policy and Governance				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				

Total	100 Marks
Duration of Exam	03 Hours

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

COURSE OUTCOMES

After completion of the course, student will be able to

CO1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.

CO2. Understand the public policy and governance on the largest gamut of its canvas.

CO3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making

CO4. Understand various concepts, and techniques of governance and its policy-making decisions

CO5. Gain opportunity to learn implementation and evaluation of public policies and governance in real life situations

UNIT-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

UNIT-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

UNIT-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

UNIT-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain.

State and Governance: Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

UNIT-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation.

Techniques of Governance: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

Text and Reference books

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

TECHNICAL ANSWERS TO REAL WORLD PROBLEMS

Semester	V				
Course code					
Category	Open elective				
Course title	Technical Answers to Real World Problems				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES

1. To help students to identify the need for developing newer technologies for industrial / societal needs
2. To train students to propose and implement relevant technology for the development ofthe prototypes / products
3. To make the students learn to the use the methodologies available for analysing the developed prototypes / products

COURSE OUTCOMES

At the end of the course, the student will be able to

CO1. Identify real life problems related to society

CO2. Apply appropriate technology(ies) to address the identified problems using engineering principles and arrive at innovative solutions

SYLLABUS

1. Identification of real life problems
2. Field visits can be arranged by the faculty concerned
3. 6 – 10 students can form a team (within the same / different discipline)
4. Minimum of eight hours on self-managed team activity
5. Appropriate scientific methodologies to be utilized to solve the identified issue
6. Solution should be in the form of fabrication/coding/modeling/product design/process design/relevant scientific methodology(ies)
7. Consolidated report to be submitted for assessment
8. Participation, involvement and contribution in group discussions during the contact hours will be used as the modalities for the continuous assessment of the theory component
9. Project outcome to be evaluated in terms of technical, economical, social, environmental, political and demographic feasibility
10. Contribution of each group member to be assessed
11. The project component to have three reviews with the weightage of 20:30:50

LEARN STARTUP MANAGEMENT

Semester	V				
Course code					
Category	Open elective				
Course title	Learn Startup Management				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	

Classwork	30 Marks
Exam	70 Marks
Total	100 Marks
Duration of Exam	03 Hours

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVES

To understand new venture creation opportunities, its resources, and requirements for Enterprise Start-up.

COURSE OUTCOMES

On successful completion of this course, the students will be able:

CO1: Develop a start-up Enterprise with Big Idea Generation.

CO2: Analyze start-up capital requirement by analyzing legal factors.

CO3: Interpret feasibility Analysis towards funding issues.

CO4: Access growth stages in new venture and reasons for scaling ventures.

CO5: Evaluate financial stability and decide on expansion possibilities

UNIT-I

Start-up opportunities: The New Industrial Revolution – The Big Idea- Generate Ideas with Brainstorming- Business Start-up - Ideation- Venture Choices - The Rise of The start up Economy - The Six Forces of Change- The Start-up Equation – The Entrepreneurial Ecosystem – Entrepreneurship in India. Government Initiatives.

UNIT-II

Startup Capital Requirements and Legal Environment: Identifying Startup capital Resource requirements - estimating Startup cash requirements - Develop financial assumptions, Constructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics - The Legal Environment- Approval for New Ventures, Taxes or duties payable for new ventures.

UNIT-III

Starting up Financial Issues: Feasibility Analysis - The cost and process of raising capital – Unique funding issues of a high-tech ventures - Funding with Equity – Financing with Debt- Funding startups with bootstrapping- crowd funding- strategic alliances.

UNIT-IV

Start-up Survival and Growth: Stages of growth in a new venture- Growing with the market - Growing within the industry- Venture life patterns- Reasons for new venture failures, Scaling Ventures – preparing for change - Leadership succession. Support for growth and sustainability of the venture.

Planning for Harvest and Exit: Dealing with Failure: Bankruptcy, Exit Strategies, Selling the business - Cashing out but staying in-being acquired- Going Public (IPO) – Liquidation

Reference Books:

1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, CengageLearning, 2016.
2. AnjanRaichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
3. S. R. Bhowmik& M. Bhowmik, Entrepreneurship, New Age International, 2007.
4. Steven Fisher, Ja-nae' Duane, The Startup Equation -A Visual Guidebook for Building Your Startup, Indian Edition, Mc Graw Hill Education India Pvt. Ltd, 2016.
5. Donald F Kuratko, Jeffrey S. Hornsby, New Venture Management: The Entrepreneur's Road Map, 2e, Routledge, 2017.
6. Vijay Sathe, Corporate Entrepreneurship, 1e, Cambridge, 2009

HUMAN RESOURCE MANAGEMENT

Semester	V				
Course code					
Category	Open Elective Courses				
Course title	Human Resource Management				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of

14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVE:

To help the students develop an understanding of the management of human resources and develop abilities and skills required to manage them.

UNIT I

Introduction – nature and scope of human resource management, HRM objectives and functions, HRM policies, HRM in globally competitive environment; strategic human resource management.

UNIT II

Acquiring human resources – Man power planning, Job evaluation, job analysis and job design. Recruitment: Sources, Methods, constraints & challenges, selection: objectives and process, placement and induction.

UNIT III

Developing human resources: Training: types, methods, training vs. development and evaluation of a training programme and training need assessment, career planning and development.

UNIT IV

Performance appraisal: methods, process and challenges of performance appraisal, performance appraisal vs. potential appraisal, Compensation: wages & salaries administration and factors influencing compensation levels.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

CO1: To have an understanding of the basic concepts, functions and processes of human resource management

CO2: To be aware of the role, functions and functioning of human resource department of the organizations.

CO3: To Design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals and Reward Systems, Compensation Plans and Ethical Behavior.

CO4: Develop ways in which human resources management might diagnose a business strategy and then facilitate the internal change necessary to accomplish the strategy.

TEXT AND REFERENCE BOOKS:

1. Jyothi, Human Resource Management, Oxford University Press
2. Bohlander George and Scott Snell, Management Human Resources, Cengage, Mumbai
3. Bhattacharyya, Dipak Kumar, Human Resource Management, Excel Books, NewDelhi
4. Cascio Wayne F., Managing Human Resources, TMH, New Delhi
5. DeCenzo, David A, and Stephan P. Robbins, Fundamentals of Human Resource Management, Wiley India, New Delhi
6. Denisi, Angelo S, and Ricky W Griffin, Human Resource Management, Biztantra, New Delhi

CRYPTOCURRENCY WITH ETHEREUM

Semester	V				
Course code					
Category	Open Elective Courses				
Course title	Cryptocurrency With Ethereum				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVE:

1. To introduce the concepts of cryptocurrency.
2. To understand working of Bitcoin and Ethereum
3. To study the security issues and safeguards related to bitcoin trading
4. To study governing cryptocurrency regulations and its impact on economy.

UNIT I

Cryptocurrency: History, Distributed Ledger Technology (DLT), cryptocurrency in blockchain, Cryptographic basics for cryptocurrency: overview of Hashing, signature schemes, encryption schemes and elliptic curve cryptography.

UNIT II

Bitcoin: Creation of coins, Wallet, Genesis Block, Merkel Tree, Bitcoin Scripts, Bitcoin P2P Network, hardness of mining, Transaction in Bitcoin Network, transaction verifiability, anonymity, forks, payments and double spending, Consensus in a Bitcoin network, mathematical analysis of properties of Bitcoin, Bitcoin protocols – Bitcoin Mining strategy and rewards, life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

UNIT III

Ethereum: Ethereum Virtual Machine (EVM), Wallets for Ethereum, Ethereum Programming Language: Solidity, Smart Contracts, The turing completeness of smart contract languages, attacks on smart contracts, Ethereum Construction, DAO, GHOST, Vulnerability, Attacks, Sidechain: another type of blockchain, Namecoin

UNIT IV

Cryptocurrency Regulation: Stakeholders, Roots of Bitcoin, Bitcoin scripting vs Ethereum smart contracts, Legal Aspects - Cryptocurrency Exchange, Black Market and Global Economy, Global Acceptability perspective.

MOBILE AND SMARTPHONE FORENSICS

Semester	V				
Course code					
Category	Open Elective Courses				
Course title	Mobile And Smart Phone Forensics				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

COURSE OBJECTIVE:

1. To understand mobile device forensics.
2. To learn different types of digital evidence.
3. To gain knowledge of different system like and roid and ios.
4. To understand mobile file system & data structures.

UNIT I

Mobile Forensic: Cell phone and mobile device forensics, Understanding Mobile device forensics, Understanding acquisition procedure, Cell phone Crimes, SIM Architecture, Data Storage, Data Extraction, Files Stored on SIM, Mobile Operating System.

UNIT II

Digital Evidence: Mobile Device Forensics, Types of Evidence on Mobile Devices, Handling Mobile Devices as Sources of Evidence, Forensic Preservation of Mobile Devices, Forensic Examination and Analysis of Mobile Devices, Forensic Acquisition and Examination of SIM Cards, Investigative Reconstruction Using Mobile Devices Future Trends.

UNIT III

Andriod and IOS Systems: Architecture, Differentiation, Technological Composition, Introduction to Andriod Platform, Introduction to IOS Platform.

UNITIV

Mobile File Systems and Data Structures: Introduction, What and How of Data, Types of Memory, File Systems, Rootfs, devpts, sysfs, cgroup, yaffs2, Procedure for handling an Andriod Devices, Logical Techniques VS Digital Techniques, Introduction to Mobile Malware.

COURSE OUTCOMES:

At the end of this course, students will demonstrate the ability to

CO1: Mobile device forensics.

CO2: Different type of mobile file system & digital forensic.

CO3: Technological composition of android & ios systems.

CO4: Mobile file system & data structures.

TEXT AND REFERENCE BOOKS:

1. Guide to Computer Forensics and Investigations By Bill Nelson, Amelia Phillips, Christopher Stuart.
2. Digital Evidence on Mobile Devices.
3. Digital Evidence and Computer Crime, Third Edition Eoghan Casey. Published by Elsevier Inc. All rights reserved.
4. Andriod Forensic, Investigation, and Security by Andrew Hogg, Publisher Synergy Security in Mobile Communication by Professor Noureddine Boudriga. Mobile Malware Attacks and Defense By Ken Dunham.

TEXT AND REFERENCE BOOKS:

1. Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction by Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Princeton University Press (July 19, 2016).
2. Mastering Bitcoin: Unlocking Digital Cryptocurrencies by Antonopoulos
3. Bitcoin: A Peer-to-Peer Electronic Cash System by Satoshi Nakamoto
4. ETHEREUM: A Secure Decentralized Transaction Ledger by Gavin Wood, Yellow paper.2014.
5. A survey of attacks on Ethereum smart contracts by Nicola Atzei, Massimo
6. Bartoletti, and Tiziana Cimoli

VEDIC MATHEMATICS

Semester	V				
Course cod					
Category	Professional Elective Course – I				
Course title	Vedic Mathematics				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Classwork	30 Marks				
Exam	70 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: The examiner will set nine questions in total. Question one will be compulsory. Question one will have seven parts of 2 marks each from all units, and the remaining eight questions of 14 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, the first being compulsory and selecting one from each unit.

Introduction to course: Vedic Mathematics is a collection of Methods or Sutras to solve numerical computations quickly and faster. It is of utmost importance to the future managers to be able to perform faster calculations as a tool for effective time management. Its Sutras can be applied to the solving of problems in arithmetic, algebra, geometry, calculus, conics, etc. which will make our students better equipped.

Unit I

Introductions & History of Vedic Mathematics, Introduction to Father of Vedic Mathematics "Jagatguru Bharti Krishan Tirthji" Multiplications-using Sutras- Ekanyunena Purvena, Ekadhikena Purvena, Nikhilam Navatahcarmam Dastah, Vertically & Crosswise, Sum of Products, Difference of products, Sum and difference of Products in arithmetic and algebra. Cross digit sum to check the answers of addition, multiplication and subtraction.

Unit II

Square using Sutras- Ekadhikena Purvena, Nikhilam Navatahcarmam Dastah, Duplex in arithmetic and Algebra, Sum of squared numbers, difference of squared numbers, Sum and difference of squared Numbers, Cube using Sutras-Nikhilam and Anurupyena, Contribution to Mathematics by Bhaskracharya-II

Unit III

Square root using Vilokanam and Duplex, Cube root upto 9 digits, divisibility by denominator ending digits 1, 3, 7 & 9, Division by Sutras-Paravartya, Ekadhikena, Nikhilam Navatahcarmam Dastah, Dhwajank having divisor upto 3 digits, Division of Algebraic Expressions having divisor linear and quadratic Contribution to Mathematics by Arybhatt

Unit IV

Solution of Simple equations, Solutions of simultaneous linear equations in two variables, factorization in arithmetic, factorization of quadratic and cubic expressions, Highest Common Factors in arithmetic and algebraic expressions, Baudhyan Numbers.

Course Outcomes

CO 1: Develop the understanding of objectives and features of Vedic maths.

CO 2: Manage to solve various mathematical operations using Vedic sutras.

CO3: Recognize the inert potential of students and improve their mathematical abilities and also drastically enhance their academic performance.

Suggested Readings 1. Atul Gupta, The Power of Vedic Math, Jaico Publishing House

2. Vera E. Stevens, Pebble Maths: A new and successful way to teach Vedic Math to beginner learners of all ages and abilities, Pebble Maths Publishing House

3. Rajesh Kumar Thakur, The essentials of Vedic mathematics, Rupa Publications, India