Program Structure and Syllabus

B. Tech IV Year

Cyber Security

R22 Regulations

B. TECH IV YEAR I SEMESTER [4 T + 4 P]

S.No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A57054	HSS&MC	Managerial Economics and Financial Analysis	2	1	0	3.0
2	A57078	PCC	Introduction to Block chain Technology	3	1	0	4.0
3	A57066	PEC-IV	1. Big Data Analytics	3	1	0	4.0
	A57083		2. Machine Learning and its Applications				
	A57084		3. Ethical Hacking				
4	A57080	OEC - I	1. Essential English and Employability Skills	3	0	0	3.0
	A57081		2. Technical and Business Communication Skills				
	A57082		3. English for Professionals				
5	A57218	PCC LAB	Internet of Things Lab	0	0	4	2.0
6	A57219	PCC LAB	Block chain Technology Lab	0	0	4	2.0
7	A57214	PEC-IV LAB	1. Big Data Analytics	0	0	4	2.0
	A57221		2. Machine Learning				
	A57222		3. Ethical Hacking				
8	A57230	PROJ	Industry Oriented Mini Project	0	0	4	2.0
			TOTAL	**11**	**3**	**16**	**22**

B. TECH IV YEAR II SEMESTER [2 T + 3 P]

S.No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A58023	OEC-II	1. Management Science	2	1	0	3.0
	A58024		2. Operations Research				
	A58002		3. Intellectual Property Rights				
2	A58005	OEC-III	1. Negotiation Skills	2	1	0	3.0
	A58008		2. Project Management				
	A58010		3. Value Engineering				
3	A58201	PROJ	Seminar	0	0	4	2.0
4	A58202	PROJ	Comprehensive Viva-Voce	0	0	0	2.0
5	A58203	PROJ	Project	0	0	20	10.0
			TOTAL	**4**	**2**	**24**	**20**

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57054	HSS & MC	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

Course Objectives of Managerial Economics and Financial Analysis are to:

The objective of this course is to familiarize the student with the concepts of managerial economics and financial accounting, demand and cost concepts, market structures, pricing and financial ratios

Course Outcomes

At the end of this Managerial Economics and Financial Analysis course, students will be able to:

1. Describe the concept of demand and its determinants in managerial decisions.
2. Know the cost concepts and breakeven analysis in production.
3. Identify various market structures and different pricing strategies.
4. Have knowledge of capital budgeting techniques in financial decisions.
5. Have knowledge of Ratios in solving of business problems.

UNIT I

Introduction to Managerial Economics: Definition, nature and scope of managerial economics, demand analysis - demand determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, types, measurement and significance of elasticity of demand, demand forecasting, methods of demand forecasting.

UNIT II

Theory of Production and Cost Analysis: Production Function – Isoquants and Iso costs, MRTS, Least Cost Combination of Inputs.

Cost Analysis: Cost concepts, Opportunity cost, Breakeven Analysis (BEA) – determination of breakeven point, managerial significance and limitations of BEA.

UNIT III

Market structures: Types of competition, features of perfect competition, monopoly and monopolistic competition, price - output determination in perfect competition.
Objectives and Policies of Pricing: objectives of pricing**,** methods of pricing - cost plus pricing, marginal cost pricing, going rate pricing, limit pricing, market skimming pricing, penetration pricing, two - part pricing, block pricing, peak load pricing, cross subsidization.

UNIT IV

Capital and Capital Budgeting: Capital and its significance. Types of capital estimation of fixed and working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals. Methods of capital Budgeting: Payback Method. Accounting Rate of Return (ARR) and Net Present Value Method.

UNIT V

Introduction to Financial Accounting: Definition of Accounting**,** Double-Entry Book Keeping, Journal, Ledger, and Trial Balance, Final Accounts.
Ratio Analysis: Computation, Analysis and Interpretation of Liquidity Ratios Activity Capital Structure Ratios and Profitability Ratios.

Text Books

1. Arya Sri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2014.

Reference Books

1. R. K. Sharma & Shashi K Gupta, Financial Management, Kalyani Publishers, 2020
2. V. Rajasekaran & R. Lalitha, Financial Accounting, Pearson Education, 2010.
3. Domnick Salvatore, Managerial Economics in a Global Economy, 9e, Oxford Univ Press, 2018.
4. S N Maheshwari, CA Sharad K Maheshwari & Dr Suneel K Maheshwari, Financial Accounting, 6/e, Vikas Publications, 2018.

INTRODUCTION TO BLOCK CHAIN TECHNOLOGY

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57078	Program Core	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	50	100

Course Objectives

Course Objectives of Block Chain Technology are to:

1. Identify different components and types of Blockchain
2. Apply Ethereum tool for application development
3. Interpret various components of DApps and multichain
4. Summarize the architecture of Hyperledger Fabric
5. Analyze the impact of Blockchain in business

Course Outcomes

At the end of this Block Chain Technology course, students will be able to:

1. Summarize types and applications of Blockchain
2. Design and deploy smart contract through Ethereum
3. Apply DApps through Truffle IDE
4. Apply Hyper Ledger Fabric model in different Networks
5. Categorize different Business Applications of Blockchain

UNIT I

What is Blockchain: Definition, history, Digital Money to Distributed Ledgers

Why Blockchain: Properties of Blockchain, Requirements for consensus protocols, Proof of Work (PoW), Proof of Stake (PoS), Zero Knowledge Proofs, Byzantine Models, hashing, Merkle Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Types of Blockchain

UNIT II

Ethereum Solidity: Introduction, Datatype, operator, enum, arrays, loops, Mapping, Structure, State Modifiers, Exception Handling in Solidity, Inheritance, Events, Self-Destruction, ERC Tokens, Constructors, Libraries, Compile and Deploy the Smart Contract

UNIT III

Truffle IDE: Creating user interface, textboxes, radio buttons, drop down list, developing a DApp, Publish the DApp Connecting to DApp, truffle migrate, truffle test.
Multichain: Chain code (go) and Multi Chain, Privacy and Permissions in Multi Chain, Mining in Multi Chain, Multiple configurable Blockchains using Multi Chain, Setting up a Private Blockchain, Blockchain Bytes

UNIT IV

Hyperledger (go Lang): Introduction, architecture, Consensus, API, frameworks, setting up Development Environment using Composer, Developing and Testing business networks, Hyperledger Fabric Model Various ways to create Hyperledger Fabric Blockchain Network

UNIT V

Blockchain transforming business, Blockchain in governance.
Case Studies: Supply chain management, real estate, healthcare, Government sectors, bitcoin.

Text Book

1. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guide to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017

Reference Books

1. Chandramouli Subramanian,Asha A George,Abhilash K A and Meena Karthikeyan, Blockchain Technology, Published by University Press
2. Philipp Hacker, Ioannis Lianos, Regulating Blockchain: Techno-Social and Legal Challenges, OUP Oxford. (ISBN-13: 978-0198842187), 2019
3. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos Blockchain by Melanie Swa, O'Reilly
4. Hyperledger Fabric - https://www.hyperledger.org/projects/fabric
5. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits - https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html

BIG DATA ANALYTICS (PE-IV)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57066	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	50	100

Course Objectives

Course Objectives of Big Data Analytics are to:

1. Discuss the overview of big data analytics concepts and growth rate
2. Introduce the tools required to manage and analyze big data like Hadoop, NoSQL Data Management.
3. Summarize the fundamental concepts of Hadoop Distributed file systems
4. Describe the techniques involved with Map Reduce Applications.
5. Analyze various recommender systems for applications

Course Outcomes

At the end of this Big Data Analytics course, students will be able to:

1. Appraise the concept and application of Big Data
2. Apply scalable algorithms on NO SQL for big data analytics.
3. Elaborate the notion of Hadoop Distributed File System and applications
4. Apply MapReduce for the given problem
5. Implement recommender systems for different application

UNIT I

Introduction To Big Data: Characteristics of Big Data, Traits of Big data, Challenges of Conventional Systems, Sources of Big Data, Applications of big data, Features and benefits of big data, Analysis vs Reporting, CAP theorem, Modern Data Analytic Tools. **Introduction to Hadoop Programming languages**: Pig, Hive. **NOSQL Databases**: Cassandra, Mongo, HBase.

UNIT II

NOSQL Data Management: Introduction to NoSQL, aggregate data models, aggregates, key-value and document data Models, relationships, graph databases, schema less databases, materialized views, distribution models, sharding, master-slave replication, peer-peer replication, sharing and replication

UNIT III

Introduction To Hadoop: History of Hadoop, Data Storage and Analysis, Hadoop – Setup, Hadoop operation modes, Configurations of Hadoop.
Hadoop Ecosystem, Hadoop Distributed File System, HDFS Architecture, concepts of Blocks in HDFS Architecture, Name Nodes and Data Nodes, using command Line Interface with HDFS, HDFS Commands, Features of HDFS.

UNIT IV

MapReduce Applications: MapReduce workflows, unit tests with MR Unit, test data and local tests, anatomy of MapReduce job run, classic Map-reduce, YARN, failures in classic MapReduce and YARN, job scheduling, shuffle and sort, task execution, MapReduce types, input formats, output formats

UNIT V

Social Media Analytics and Text Mining: Introducing social media; Key elements of social media; Sentiment Analysis, Performing Social Media Analytics.

Text Book

1. BIG DATA- Black Book, Dream Tech Press, 2019.

Reference Books

1. Seema Acharya, S. Chellappan," Big Data and Analytics", Wiley,2014
2. Tom White "Hadoop: The Definitive Guide" 4th Edition, O'reilly Media, 2015.
3. Michael Minelli, Michele Chambers, Ambiga Dhiraj, Jim Stogdill, "Big Data Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", 1st Edition, Wiley Publications,2013
4. Chris Eaton, Dirk De Roos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGraw Hill Publishing, 2012
5. Pete Warden, "Big Data Glossary", O'Reilly, 2011.

MACHINE LEARNING AND ITS APPLICATIONS (PE-IV)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57083	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	50	100

Course Objectives

Course Objectives are to:

1. Summarize the need for machine learning for various problem solving
2. Outline the various supervised learning algorithms in machine learning
3. Discuss various unsupervised learning algorithms in machine learning
4. Elaborate Artificial Neural network and deep learning
5. Describe active learning, instance-based learning and ensemble learning

Course Outcomes

At the end of this course, students will be able to:

1. Describe Fundamental concepts of machine learning and its applications.
2. Apply supervised learning algorithms for the given problem
3. Compare the performance of unsupervised learning algorithms
4. Discuss Artificial Neural Network and deep learning
5. Appraise active learning, instance-based learning and ensemble learning

UNIT I

Introduction to Machine Learning: What is Machine Learning, Why Machine Learning, Types of Machine Learning Systems, Challenges of Machine Learning, Applications of Machine Learning, Essential libraries and Tools, Generalization overfitting and underfitting, Bias–variance trade-off, metrics (TB-1)

UNIT II

Supervised Learning: Classification and Regression, Linear Regression: Single and Multiple, Logistic Regression: Ridge Regression, Lasso Regression, k-Nearest Neighbour, Naive Bayes Classifier, Decision Tree, Support Vector Machine (TB-1)

UNIT III

Unsupervised Learning: Introduction, Supervised Vs Unsupervised Learning, Applications of Unsupervised Learning, clustering, k-Means Clustering, Agglomerative Clustering, Comparing and evaluating the clustering algorithms (TB-2).

UNIT IV

Artificial Neural Networks - Introduction, Understanding the Biological Neuron, Exploring the Artificial Neuron, Types of Activation Functions, Early Implementations of ANN, Architectures of Neural Network: Single-layer feed forward network, Multi-layer feed forward ANNs, Recurrent network, Learning Process in ANN, Backpropagation, Deep Learning (TB-1).

UNIT V

Other types of learning: Introduction, Representation of Learning, Active Leaning, Heuristic for Active Learning, Active Learning Query Strategies, Instance Based Learning, Radial Basis function, Ensemble learning algorithms, bagging, boosting, gradient boosting Machines (TB-1).

Text Books

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Machine Learning, 2019, Pearson.
2. Andreas C. Müller, Sarah Guido, Introduction to Machine Learning with Python, October 2016, O'Reilly Media, Inc.

Reference Books

1. Aurélien Géron, Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems, 2019.
2. Tom M. Mitchell, Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.
3. Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
4. Stephen Marsland, Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
5. http://www.cs.cmu.edu/~tom/mlbook.html

ETHICAL HACKING (PE-IV)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57084	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		3	1	0	4	50	50	100

Course Objectives

Course Objectives of Ethical Hacking are to:

1. Outline the various types of Ethical Hacking
2. Discuss about basic footprinting concepts
3. Summarize various malware threats
4. Describe web server Hacking
5. Identify various digital forensics problems

Course Outcomes

At the end of this Ethical Hacking course, students will be able to:

1. Summarize Types of Ethical Hacking.
2. Explain about web and network hacking
3. Demonstrate report writing and Mitigation
4. Formulate the use of safe techniques on the World Wide Web
5. Analyze various digital forensic problems

UNIT I

Introduction to Ethical Hacking:Security Fundamental, Security testing, Hacker and Cracker, Descriptions, Test Plans-keeping It legal, Ethical and Legality, The Attacker's Process, The Ethical Hacker's Process, Security and the Stack

UNIT II

Foot printing and Scanning: Information Gathering, Determining the Network Range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack Surface, Enumeration, System Hacking

UNIT III

Malware Threats: Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures, Sniffers, Session Hijacking, Denial of Service and Distributed, Denial of Service

UNIT IV

Web Server Hacking: A Web Server Hacking, Web Application Hacking, Database Hacking, Wireless Technologies, Mobile Device Operation and Security, Wireless LANs

UNIT V

IDS, Firewalls and Honeypots: Intrusion Detection Systems, Firewalls, Honeypots, Physical Security, Social Engineering, Case Studies

Text Book

1. Ec-Council, “Ethical Hacking and Countermeasures: Attack Phases”, Delmar Cengage Learning, 2009.
2. Michael T. Simpson, Kent Backman, James E. Corley, “Hands-On Ethical Hacking and Network Defense”, Cengage Learning, 2012

Reference Books

1. Patrick Engebretson, “The Basics of Hacking and Penetration Testing – Ethical Hacking and Penetration Testing Made Easy”, Syngress Media, Second Revised Edition, 2013.
2. Jon Erickson, “Hacking: The Art of Exploitation”, No Starch Press, Second Edition, 2008.

ESSENTIAL ENGLISH AND EMPLOYABILITY SKILLS (OEC-I)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57080	Open Elective-I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Introduction

The purpose of graduate education is not only to gain knowledge but also to acquire employability skills fit for the qualification. The challenge of fresh graduates does not end with merely acquiring a job but to maintain credibility and sustainability throughout their career. Hence, varied skills and competencies are the pre-requisites for professional students who emerge from colleges and are ready to take up global careers.

Course Objectives

1. To enable students to develop their personality, infuse confidence and increase employability skills in any chosen career
2. To provide the students hands-on experience to cope with the demands of the world of recruiters
3. To help the students acquire the job skills essential for employment.

Course Outcomes

At the end of this course, students will be able to:

1. Enhance employability skills and professional etiquette to work in the corporate world
2. Develop leadership, interpersonal and decision-making skills
3. Acquire productive knowledge, competent learning, and innovative thinking skills from specifically selected lessons
4. Analyze the importance of tackling various job interviews
5. Provide insights to implement verbal and non-verbal communication competencies in workplace

UNIT I

Six Sigma: Dabbawala from English for Employability
Personality Development: A Must for Leadership and Career Growth from Personality Development and Soft Skills
Introduction - Learning about Personality Development from 3 Cases - Personality Analysis - Freudian analysis of Personality Development - Swami Vivekananda's Concept of Personality Development - Personality Begets Leadership Qualities

UNIT II

Yet I am not defeated! from English for Employability
Interpersonal skills from Personality Development and Soft Skills
The Personality Attribute of Taking Bold Decisions - Personality Types and Leadership Qualities - Personality Tests

UNIT III

Patricia Narayanan: An Entrepreneur by accident, from English for Employability
Soft Skills: Demanded by Every Employer from Personality Development and Soft Skills
Introduction to Soft Skills - Lessons from the 3 Case Studies - Change in Today's Workplace - Soft Skills as a Competitive Weapon - Antiquity of Soft Skills - Classification of Soft Skills

UNIT IV

Satya Nadella: CEO of Microsoft from English for Employability
Interview Skills from Personality Development and Soft Skills

UNIT V

Body Language Reveals Your Inner self and Personality from Personality Development and Soft Skills. Introduction - Emotions Displayed by Body Language – Handshake -The Most Common Body Language - Eyes - A Powerful Reflection of One's Inner self - Entry to My Space - Personal Zones may vary - Body Language exhibited during different Professional Interactions.

Text Books

1. Purushotham, K. English for Employability. Orient Black Swan, Hyderabad.
2. Mitra, K. Barun. Personality Development and Soft Skills. Oxford University Press.

Reference Books

1. Enhancing English and Employability Skills. State Board of Technical Education and Training. Hyderabad: Orient Black swan Private Limited, 2012.
2. Rao, M. S. Soft Skills Enhancing Employability. New Delhi: I. K. Publishing House, 2010.
3. Rao, Nageshwar. Communication Skills. New Delhi: Himalaya Publishing House Pvt. Ltd, 2008.
4. Sharma, T. K. Enhancing Employability in Education. India: Patridge Publishing House. 2015.
5. Yadav, Shalini. Communication Technique. New Delhi: University Science Press, 2010.

TECHNICAL AND BUSINESS COMMUNICATION SKILLS (OEC-I)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57081	Open Elective-I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Introduction

The course is intended to expose the students to learn and practice the five communication skills: thinking, listening, speaking, reading, and writing in English, the global language of communication. It reflects some of the approaches in English language teaching and learning currently in practice around the world.

Course Objective

To help the students to develop effective communication skills in all communicative contexts for professional advancement.

Course Outcomes

At the end of this Technical and Business Communication Skills course, students will be able to:

1. Communicate technical and business correspondence
2. Reflect on the themes discussed
3. Recognize ethical implications of technical communication in professional contexts
4. Identify the contemporary issues in engineering from environmental, societal, economic, and global perspectives
5. Demonstrate ethical decisions in complex situations

UNIT I

E-World & E-Communication

E-language **-** E-governance **-** E-commerce/E-business **-** E-banking **-** E-waste

UNIT II

Business Establishment & Infrastructure Development

Power Supply **-** Industrial Park **-** Business Correspondence: Follow-up letters - Acceptance & Rejections **-**Persuasive letters **-** Resignation letters

UNIT III

Technology and Society

Robot Soldiers - For a Snapshot of a Web - Placing an order - Proposal Writing - Patents & Rights (National & International) - Intellectual Property – Nanotechnology

UNIT IV

Ethics in Business Communication
Ethical issues involved in Business Communication - Ethical dilemmas facing managers - Ethical Code & Communication - Standards in Daily Life - Total Quality Management - World University Ranking

UNIT V

Management Information System
Corporate Governance - Business Process Outsourcing - Project Management Communication - Marketing Communication

Text Book

1. English and Communication Skills for Students of Science and Engineering by S P Dhanavel. Orient Black Swan. 2009.

Reference Books

1. Business Communication (Second Edition) by Meenakshi Raman & Prakash Singh by Oxford University Press. 2012.
2. Language and Communication skills for Engineers by Sanjay Kumar & Pushp Lata by Oxford University Press. 2018.
3. Business Communication by Anjali Kalkar, et.al. Orient Black Swan. 2010.
4. Technical Communication by Paul V. Anderson. Cengage. 2014.
5. Engineering Communication by Charles W. Knisely & Karin I. Knisely. Cengage. 2015.

ENGLISH FOR PROFESSIONALS (OEC-I)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57082	Open Elective-I	L	T	P	C	CIE	SEE	Total
		3	0	0	3	50	50	100

Introduction

The course aims at preparing the students with the tools needed for successful communication at the professional front. It is designed to improve students' academic and professional skills which the employers are currently looking for.

Course Objective

To prepare the students to use the language effectively in all professional pursuits

Course Outcomes

At the end of this Computer Networks course, students will be able to:

1. Analyze the language use in communicative process
2. Describe the process and product
3. Interpret the ideas in group activities
4. Apply different approaches to comprehend the written text
5. Write any technical and official correspondence within the framework

UNIT I

Essentials of Communication:
Essentials of Grammar**-**Rudiments of Communications Skills (Listening, Speaking, Reading, and Writing)- Applied Grammar and Usage- Non-Verbal Communication.

UNIT II

Listening Skills:
Art of Listening- Developing Effective Listening Skills-Process of Listening, Intensive & Extensive Listening
Podcasts, Vodcasts (ICT enabled) - Five steps to Active Listening-Effective and Ineffective Listening Skills-Listening & Note-taking

UNIT III

Speaking Skills:
Dynamics of Effective Speaking -Group Discussion-Simulated Presentations, Process & Product Descriptions- Proxemics, Paralinguistic Features

UNIT IV

Reading Skills:
The Art of Effective Reading- Basic steps to Effective Reading-Extensive and Intensive Reading -Approaches to Efficient Reading-Reading Comprehension

UNIT V

Writing Skills:
Art of Condensation-Descriptive Writing Techniques-Writing & Answering Memos, Circulars -Inter & Intra Official Communication -Writing Minutes of Meeting-Netiquette - E-mail & Blog Writing - Note-making

Text Book

1. Kumar, Sanjay and Pushp Lata, Communication Skills, Second edition, Oxford University Press, 2015.

Reference Books

1. Adair, John.The Effective Communicator. Jaico Publishing House.1995.
2. Adler, B.Ronald.Communicating at Work.(Seventh edition.) McGraw Hill.2004.
3. Aruna, Koneru. Professional Communication.McGraw Hill.2017.
4. Ibbotson,Mark.Cambridge English for Engineering Professionals. Cambridge University.2008.
5. Oxford English for Careers.Oxford University Press.

INTERNET OF THINGS LAB (PCC LAB)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57218	Program Core	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Outcomes

At the end of this Internet of Things Lab course, students will be able to:

1. Identify the sensors and actuators required for their application and control through programs
2. Differentiate the two basic boards and select the one which is suitable for their requirement.
3. Establish network connectivity over different components by applying network protocol.
4. Demonstrate serial communication with the help of UART, ADC, DAC
5. Design Traffic system, Health Care System as an IoT application.

List of Experiments

Week 1

Basics of Internet of Things: Sensors, Actuators, IoT architecture and Gateway

Week 2

GPIO programming using Raspberry pi Arduino with few examples.

Week 3

GPIO programming using Raspberry pi with few Examples

Week 4

Blinking LED through Raspberry pi or Arduino.

Week 5

IoT sensors interface with Raspberry pi or Arduino (Temperature/Light sensors).

Week 6

IoT Networking: Connectivity technologies, Protocols and Interoperability in IoT.

Week 7

Speed Control of motors using PWM with python programming.

Week 8

Use sensors to measure temperature, humidity, light and distance.

Week 9

Integration of Actuators with Raspberry pi or Arduino (Servo motor/Relay).

Week 10

Capture Image with Raspberry pi or Arduino.

Week 11

Design Traffic control system: using Raspberry pi or Arduino.

Week 12

Design Temperature dependent auto cooling system: Using Raspberry pi or Arduino.

Week 13

IoT applications in home automation: Implementing IoT home applications using Raspberry pi or Arduino.

Week 14

Experiment on HTTP-to-CoAP semantic mapping Proxy in IoT Toolkit.

Week 15

DAC conversion using Raspberry pi or Arduino.

Week 16

ADC conversion using Raspberry pi or Arduino.
Review.

Text Book

1. Arshdeep Bahga and Vijay Madisetti, Internet of Things A Hands –on approach, Universities Press, 2015.

Reference Books

1. HonboZhou,The Internet of Things in the Cloud: A Middleware Perspective, CRC Press, 2012.
2. Dieter Uckelmann, Mark Harrison, Florian Michahelles, Architecting the Internet of Things, Springer – 2011.
3. David Easley and Jon Kleinberg, Networks, Crowds, and Markets: Reasoning About a Highly Connected World, Cambridge University Press, 2010.
4. Olivier Hersent, Omar Elloumi and David Boswarthick, The Internet of Things: Applications to the Smart Grid and Building Automation, Wiley, 2012.

Note: The above experiments are for indicative purposes only. However, the concerned faculty member can add a few more experiments in addition to the existing. In such cases the concerned faculty member should get the syllabus approved by the BoS.

BLOCK CHAIN TECHNOLOGY LAB

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57219	Program Core	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Outcomes

At the end of this Block Chain Technology Lab course, students will be able to:

1. Implement Smart Contracts and its deployment in remix
2. Illustrate Meta mask account creation
3. Build and publish DApps
4. Implement and test Hyperledger Fabric model
5. Experiment with Blockchain Network

List of Experiments

Week 1

Introduction to remix IDE

Week 2

Write a smart contract for voting and deploy using remix.

Week 3

Write a smart contract for bidding and deploy using remix.

Week 4

Write a smart contract for fund raising to a charity and deploy using remix.

Week 5

Write a smart contract for maintaining a savings account in a bank and deploy using remix.

Week 6

Create a metamask account.

Week 7

Write a smart contract and add ERC tokens to it using Metamask.

Week 8

Deploying a DApp that runs on a test network

Week 9,10

Create and Deploy a Business Network on Hyperledger

Week 11

Set up Hyperledger Fabric Blockchain using Hyperledger Composer locally

Week 12

Create a private Blockchain and Connect to your Blockchain

Week 13

Develop a business network Deploy and Test business networks

Week 14

Creation and transaction of new assets between nodes.

Note: The above experiments are for indicative purposes only. However, the concerned faculty member can add a few more experiments in addition to the existing. In such cases the concerned faculty member should get the syllabus approved by the BoS.

BIG DATA ANALYTICS LAB (PE-IV LAB)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57214	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Outcomes

At the end of this Big Data Analytics Lab course, students will be able to:

1. Develop various programs in Hadoop.
2. Perform file operation in HDFS
3. Perform query operation using pig
4. Practice various commands in HIVE
5. Create applications for Big Data analytics

List of Experiments

Week 1

Downloading and installing Hadoop; Understanding different Hadoop modes. Start-up scripts, Configuration files.

Week 2

Implement the following file management tasks in Hadoop:

1. Adding files and directories
2. Retrieving files
3. Deleting files

Week 3

Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.

1. Find the number of occurrences of each word appearing in the input file(s)
2. Performing a Map Reduce Job for word search count (look for specific keywords in a file)

Week 4

Stop word elimination problem:
Input:

1. A large textual file containing one sentence per line
2. A small file containing a set of stop words (One stop word per line)

Output: A textual file containing the same sentences of the large input file without the words appearing in the small file.

Week 5

Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather large volumes of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented. Data available at: https://github.com/tomwhite/hadoop-book/tree/master/input/ncdc/all.

1. Find average, max and min temperature for each year in the NCDC data set?
2. Filter the readings of a set based on the value of the measurement, Output the line of input files associated with a temperature value greater than 30.0 and store it in a separate file.

Week 6

Implement of Matrix Multiplication with Hadoop Map Reduce

Week 7

Command line interface with HDFS

Week 8

Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 9

PIG Programs:

1. Run the Pig Latin Scripts to find Word Count
2. Run the Pig Latin Scripts to find a max temp for each and every year.

Week 10

Installation of Hive along with practice examples.

Week 11

Use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

Week 12

Write a Pig script for:

1. DML operations on Cassandra Database.
2. Retrieving data from MongoDB.

Week 13

HBase Shell Commands practice

Week 14

Data analytics on Amazon food dataset, find all the pairs of items frequently reviewed together.

1. Transposes the original Amazon food dataset, obtaining a PairRDD of the type:
   <user_id> → <list of the product_ids reviewed by user_id>
2. Counts the frequencies of all the pairs of products reviewed together;
3. Writes on the output folder all the pairs of products that appear more than once and their frequencies. The pairs of products must be sorted by frequency.

Note: The above experiments are for indicative purposes only. However, the concerned faculty member can add a few more experiments in addition to the existing. In such cases the concerned faculty member should get the syllabus approved by the BoS.

MACHINE LEARNING LAB (PEC-IV LAB)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57221	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Outcomes

At the end of this Machine Learning Lab course, students will be able to:

1. Explore various packages of machine learning available in Python
2. Implement various supervised learning algorithms
3. Implement clustering techniques for given problems and compare the performance
4. Perform ensemble learning for the given dataset
5. Demonstrates CNN model for image classification

Week 1

Usage of python with tool in machine learning and Data analysis using NumPy and Pandas.

Week 2

Implementation of Data visualization using Matplotlib, Seaborn

Week 3

Implementation of Data visualization using Plotly and cufflinks

Week 4

Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select the appropriate data set for your experiment and draw graphs.

Week 5

Implement logistic regression algorithm for stock prices prediction

Week 6

Implementation of decision tree based ID3 algorithm and use an appropriate data set for building the decision tree.

Week 7

Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.

Week 8

Implementation of naive Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Week 9

Implement a classifier for the sales data using a Support vector machine

Week 10

Implement K- means clustering algorithm for identifying cancerous data and compare the performance.

Week 11

Implementation of Agglomerative Clustering algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.

Week 12

Implementation of Boosting-Ada Boost and Gradient Boost to convert weak learner to strong learners.

Week 13

Develop a CNN model for image classification

Week 14

Review

Note: The above experiments are for indicative purposes only. However, the concerned faculty member can add a few more experiments in addition to the existing. In such cases the concerned faculty member should get the syllabus approved by the BoS.

ETHICAL HACKING LAB (PE-IV LAB)

B. Tech IV Year I Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A57222	Professional Elective-IV	L	T	P	C	CIE	SEE	Total
		0	0	4	2	50	50	100

Course Outcomes

At the end of this Ethical Hacking Lab course, students will be able to:

1. Conduct detailed reconnaissance using document metadata, search engines, and other publicly available information sources to build a technical and organizational understanding of the target environment.
2. Utilize scanning tools to conduct comprehensive network sweeps, port scans, OS fingerprinting, and version scanning to develop a map of target environments.
3. Recognize security vulnerabilities, such as weak configurations, unpatched systems.
4. Apply penetration testing tools to exploit and investigate vulnerable systems.
5. Implementing on web application-based attacks

List of Experiments

Week 1

Perform Network Scanning using NMAP in windows and ZENMAP in kali Linux.

Week 2

Install Wireshark and apply filters to gather different information

Week 3

Use Nessus and NIKTO tool to find all the vulnerabilities with its level and generate a report for an organization

Week 4

Find the link accessed by the victim using Wireshark

Week 5

Perform Session hijacking/ find credentials of unsecure real time website using Wireshark

Week 6

Execute basic commands of Linux

Use CHMOD command to change the privileges and permissions
Perform Kali Linux Login Bypass in virtual machine

Week 7

Perform reconnaissance to find all the relevant information on selected website using 10 network information gathering tools.

Week 8

Perform windows Login Bypass using net user and John the ripper

Week 9

Create Trojan and Exploit victim's machine by taking its complete access

Week 10

Generate Word list from using wordlist generator Crunch

Week 11

Exploit windows to gain access of victim's machine using Metasploit framework

Week 12

Exploit Windows XP using Metasploit

Week 13

Exploit Windows 10 using Metasploit

Week 14

Review

Note: The above experiments are for indicative purposes only. However, the concerned faculty member can add a few more experiments in addition to the existing. In such cases the concerned faculty member should get the syllabus approved by the BoS.

MANAGEMENT SCIENCE (OEC-II)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58023	Open Elective-II	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

Course Objectives of Management Science are to:

1. Explain the concepts of Management theories and practices.
2. Introduce to production and quality concepts in operations management.
3. Know the processes of HR and Marketing functions
4. Understand the concepts of project planning for execution of projects
5. Explain the contemporary issues and challenges faced by an organization

Course Outcomes

At the end of this Management Science course, students will be able to:

1. Explain the concepts of business management and approaches.
2. Identify the role of production and quality concepts in efficiency of operations management.
3. Analyze the key functions of human resource management and marketing management.
4. Assess time and cost factors influencing project completion
5. Describe contemporary management concepts and practices

UNIT I

Introduction to Management: Nature and importance of management, Functions of Management, Taylor's Scientific Management Theory, Fayol's principles of management, Maslow's theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two factor Theory of Motivation. Systems Approach to Management, Leadership Styles, Social Responsibilities of Manager, Organization levels and types of organization structures.

UNIT II

A. **Operations Management**: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass production), Work Study - Basic procedure involved in Method Study and Work measurement- Statistical Quality Control - X

chart, R chart, C chart, P chart, (simple problems), Acceptance Sampling.

B. **Materials Management**: Objectives, Need for inventory control, EOQ, ABC Analysis, Purchase procedure, Stores management and Stores records, Supply chain management.

UNIT III

A. Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager - Manpower Planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

B. Marketing: Functions of Marketing, Marketing Mix, Product Life cycle, Channels of distribution.

UNIT IV

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of completing the project within given time, Project Cost Analysis, Project Crashing.

UNIT V

Strategic & Contemporary Management Practices: Mission, Goals, Objectives, Policy, Strategy, Programmes, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Just-In-Time (JIT) system, Total Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) levels, Value Chain Analysis concepts.

Text Books

1. G.Shainesh, Philip Kotler, Kevin lane Keller, Alexander Chernev, Jagdish N. Sheth, Marketing Management, 16/e, Pearson, 2022.
2. Aryasri, Management Science, TMH, New Delhi, 2009

Reference Books

1. Charles W. L. Hill/Melissa A. Schilling/Gareth R. Jones, Strategic Management, 12/e, Cengage
2. William J. Stevenson, Operations Management, 13/3, McGraw Hill, 2022
3. Gary Dessler & Biju Varrkey, Human Resource Management, 16/e, Pearson, 2020

OPERATIONS RESEARCH (OE-II)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58024	Open Elective-II	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

Course Objectives of Operations Research are to:

1. Know a short history of Operations Research (OR) and be able to explain the term OR and Appreciate the nature of Linear programming problems
2. Introduce a suitable method when the problem is to maximize the objective function instead of minimizing it
3. Know processing of n-jobs through two machines, 3-machines & etc.
4. Examine the functions that inventory performs and its importance in managerial
5. Understand replacement of depreciable assets

Course Outcomes

At the end of this Operations Research course, students will be able to:

1. Construct mathematical models for linear programming problems
2. Identify minimum transportation and efficient assignment of work
3. Allocation of job sequencing models and find Value of the game with LPP models
4. Use inventory models with deterministic demand models
5. Apply replacement models in various fields

UNIT I

Introduction to Operation Research: Definition, Scope, Objectives, Phases, Models and limitations of Operation Research. Linear Programming Problem- Formulation, Graphical Solution of LPP, Simplex Method, Artificial Variable Technique (Big M and Two-Phase method) and Dual Simplex Method.

UNIT II

Transportation Problem, Formulation, Solution, Unbalanced Transportation problem. Finding basic feasible solutions- Northwest corner rule, least cost method and Vogel's approximation method. Optimality test MODI method. Assignment model: Formulation, Hungarian method for optimal solution, solving unbalanced problem and Traveling salesman problem.

UNIT III

Sequencing models: Solution of sequencing problem-Processing n x 2, n x 3, 2 x m and n x m. Game Theory: Competitive games, rectangular game with saddle point-minimax (maxmin) method of optimal strategies. Dominance principle, rectangular games without saddle point – mixed strategy for 2 X 2 games. Value of the game with Linear Programming Methods.

UNIT IV

Inventory models: Inventory costs, Models with deterministic demand-model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

UNIT V

Replacement models: Replacement of Items that deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

Text Books

1. S. D. Sharma, Operations Research.
2. Kanti Swarup, Operations Research, Sultan Chand & Sons.

Reference Books

1. Hamdy, A. Taha: Operation Research: An Introduction, PHI, 2007.
2. Hillier, F.S. Lieberman, G.J.: Introduction to operation research 8ed, Tata McGraw-Hill.
3. Gillett: Introduction to Operation Research, TMH.

INTELLECTUAL PROPERTY RIGHTS (OEC-II)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58002	Open Elective-II	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

The course aims to help the student understand the concept of Intellectual Property Rights and helps the student to appreciate the purpose and function of a trademark and the process involved in getting copyright, patent and related issues. The student is introduced to the importance of trade Secret and Geographical Indications.

Course Outcomes

At the end of this Intellectual Property Rights course, students will be able to:

1. Explain the concepts of intellectual property rights and related agencies.
2. Describe the purpose and functions of a trademark in a competitive environment.
3. Analyze the process of copyright and procedure.
4. Understand the process of patent and patent issues.
5. Explore the trade secret and geographical indications of its protection from unfair practices.

UNIT I

Introduction to Intellectual Property: Concept of intellectual property rights, importance of intellectual property rights. Types of intellectual property, international agencies, and treaties.

UNIT II

Trademarks: Concept of trademarks, purpose, and function of trademarks. Acquisition of trademark rights, protectable matter, selecting and evaluating trademark, trademark registration processes.

UNIT III

Law of Copy Rights: Concept of copyright right, fundamentals of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration.

UNIT IV

Law of Patents: Introduction to patent, foundation of patent law, patent searching process, ownership rights and transfer.

UNIT V

Trade Secrets & Geographical Indication: Law pertaining to trade secrets, determination of trade secrets. Trade secret litigation. Unfair competitions. Geographical Indication, concept of geographical indication, importance of geographical indication, new development of intellectual property rights.

Text Books

1. Deborah. E. Bouchoux, Intellectual property right, 5/e, 2018, Cengage learning.
2. Neeraj Pandey, Intellectual property right, PHI, 2019.

Reference Book

1. Ramakrishna Chintakunta and M. Geethavani, Kindle e 2021
2. Prabuddha Ganguli,Intellectual Property Right:Unleashing the Knowledge Economy, 2/e, 2017 Tata Mc Graw Hill Publishing company Ltd.

NEGOTIATION SKILLS (OEC-III)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58005	Open Elective-III	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

This is an introductory course on negotiation skills. The student is introduced to various types and stages of negotiation, basic strategies of negotiation.

Course Outcomes

At the end of this Negotiation Skills course, students will be able to:

1. Describe negotiation theories and required skills
2. Explain the various factors that affect the negotiation process and ethics involved in the negotiation
3. Apply effective negotiation strategies and tactics for different scenarios
4. Identify negotiation practices towards building relationships
5. Evaluate various strategies for conflicts resolution and effectively managing industrial relations.

UNIT I

Introduction to Negotiation: Introduction, Concept of Negotiation, Characteristics of a Negotiating Situation, Basic Negotiation Skills, Interpersonal Skills in Negotiation, Theories of Negotiation.

UNIT II

Types and Ethics in Negotiation: Types of Negotiation, Principles of Negotiation, Steps of Negotiation, Win-Win Negotiation, Negotiation Tactics, Factors Affecting Success in Negotiation.

Ethics: definition, applying ethical reasoning, approaches to ethical reasoning

UNIT III

Strategies and multiple parties and teams Negotiation: Fundamentals of negotiation, effective strategies to develop negotiation skills, anchoring / BATNA, nature

of multi-party negotiation. Differences between two party and multi-party negotiation. Managing multiparty negotiation. Inter-team negotiations.

UNIT IV

Improving Negotiation skills: Enhancing Communication skills for effective Listening, Persuasion & Relationship Building, establishing Trust-Building Relationships.

UNIT V

Managing Negotiation: Managing Different Types of Negotiations**,** Cross –Cultural Challenges in Negotiations, Industrial Negotiation: Collective Bargaining, Arbitration, Origins of Conflict, Dispute Resolution.

Text Books

1. Essentials of Negotiation, 5th Edition, Roy J Lewicki, Bruce Barry, and David M Saunders, McGraw Hill, 2020.

Reference Books

1. Beverly DeMarr and Suzanne De Janasz (2013).Negotiation and Dispute Resolution, Prentice Hall, 2013.
2. Malhotra, Deepak, Negotiating the Impossible: How to Break Deadlocks and Resolve ugly Conflicts (without money or muscle). Oakland, CA: Berrett-Koehler Publishers, 2016.

PROJECT MANAGEMENT (OEC-III)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58008	Open Elective-III	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

The course is designed to help the student understand the concepts of project management, explain how to identify the projects and planning, analyze how to execute the projects, assess how to lead the team and evaluation of projects and to explain the performance measurement and evaluation of the projects.

Course Outcomes

At the end of this Project Management course, students will be able to:

1. Explain the phases of project life cycle.
2. Identify the projects and planning the projects
3. Know the project evaluation process
4. Appreciate the role of teams in project management
5. Discuss the recent trends in project management.

UNIT I

Introduction: Introduction to project management, need for project management, project management principles. Project lifecycle, project management phases in lifecycle, project management research in brief, project management today, organization structure, stake holder management, creating a culture for project management.

UNIT II

Project Identification and Planning: Project identification process, defining the project, approaches to project screening and selection, project planning, work breakdown structure, financial module, getting approval and compiling a project charter, setting up a monitoring and controlling process.

UNIT III

Project Execution: Initiating the project, controlling and reporting project objectives, conducting project evaluation, risk, role of risk management, project management, risk management an integrated approach, cost management, creating a project budget.

UNIT IV

Leading Project Teams: Building a Project Team, Characteristics of an effective Project Team, achieving Cross- Functional Cooperation, Virtual Project Teams, Conflicts Management, Negotiations.

UNIT V

Performance Measurement and Evaluation: Monitoring Project Performances, Project Control Cycles, Earned Value Management, Human factors in Project Evaluation and Control, Project Termination, Types of Project Terminations, Project Follow-up. Current and Future Trends in Project Management.

Text Books

1. Jeffery K. Pinto, Project Management, Pearson Education, 2015

References Books

1. Clifford Gray and Erik Larson, Project Management, Tata McGraw Hill Edition, 6e, 2014.
2. R. Panneerselvam & P. Senthilkumar, Project Management, PHI, 2015
3. Thomas M.Cappels, Financially Focused Project Management, SPD, 2008.
4. Guide to Project Management Body of Knowledge (PMBOK® Guide) of Project Management Institute, USA.

VALUE ENGINEERING (OEC-III)

B. Tech IV Year II Semester					Cyber Security			
Code	Category	Hours / Week			Credits	Marks		
A58010	Open Elective-III	L	T	P	C	CIE	SEE	Total
		2	1	0	3	50	50	100

Course Objectives

The course is designed to help the student understand the concepts of Value engineering, understand different phases of value engineering and decision alternatives, and teams.

Course Outcomes

At the end of this Value Engineering course, students will be able to:

1. Understand the importance of value engineering concepts in productivity
2. Identify the different phases of value engineering projects
3. Know the different decision alternatives and choose the best alternative for optimization
4. Identify the value engineering concept in non-hardware projects and programs
5. Analyze the value engineering teams with the help of case study.

UNIT I

Introduction: Value engineering concepts, advantages, applications, problem recognition, and role in productivity, criteria for comparison, element of choice. Level of value engineering in the organization, unique and quantitative evaluation of ideas.

UNIT II

Value Engineering and Job Plan: Introduction, orientation, information phase, speculation phase analysis phase. Selection and Evaluation of value engineering projects, Project selection, methods selection, value standards, application of value engineering methodology.

UNIT III

Value Engineering Techniques: Selecting Products and Operation for Value Engineering action, Value Engineering Programmes, Decision Making for Optimum Alternative, Use of Decision Matrix, Make or Buy, Measuring Profits, Reporting Results, follow up, Use of advanced techniques like Function Analysis System.

UNIT IV

Versatility of Value Engineering: Value engineering operation in maintenance and repair activities, Value Engineering in non-Hardware Projects. Initiating a Value Engineering Programme.

UNIT V

Value Engineering Level of Effort: Value Engineering Team, Co-coordinator, Designer, different Services, Construction Management Contracts, Value Engineering Case Studies.

Text Books

1. Anil Kumar Mukhopadhyaya, “Value Engineering: Concepts Techniques and applications”, SAGE Publications 2010.
2. Del L. Younker, “Value Engineering analysis and methodology”, Marcel Dekker Inc, New York, 2004

Reference Books

1. Alphonse Dell’Isola, “Value Engineering: Practical Applications for Design, Construction, Maintenance & Operations”, R S Means Co., 1997
2. Richard Park, “Value Engineering: A Plan for Invention”, St. Lucie Press, 1999.
3. Anil Kumar Mukhopadhyaya, “Value Engineering Mastermind: From concept to Value Engineering Certification”, SAGE Publications, 2003