PEHRC20 – ELECTIVE I C- INDUSTRIAL RELATIONS

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PEHRC20	Industrial Relations	Theory	Core Elective	6	3	100

OBJECTIVES

1. To acquire knowledge on the contextual and constitutional framework of Industrial relations.
2. To familiarize with the trade unions in India.
3. To imbibe the methods of maintaining harmony within the Industry.
4. To ascertain the procedure of effectively dealing with grievances and collective bargaining in an organization.
5. To upgrade and expertise on technical advances to maintain good Industrial Relations in an organization

6.
COURSE OUTCOMES (CO)

The learners will be able to

CO1: Expertise on Industrial Concept and Labour Force in India
CO2: Understand the concept, formation, types of Trade Union in India and its Functions
CO3: It enables learners to gain in depth acquaintance on resolution of Disputes and Maintain Industrial harmony
CO4: Understand the nature, causes of Grievance Procedure and the maintenance of Successful Collective Bargaining
CO5: Learners acquire essential awareness on the Technological changes involved in maintaining Industrial Relations.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	H	H	H	H	M
CO2	M	H	H	H	H	M
CO3	H	M	M	H	H	H
CO4	H	H	M	M	H	H
CO5	H	H	H	H	H	H

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	M	M	L	M
CO2	H	H	M	M	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	H	H

H-HIGH (3), M-MODERATE (2), L-LOW (1)

Unit I: Industrial Concept and Labour Force in India   (15 hours)

 1.1 Industrial Relation, Evolution of Industrial Relations, Concept, Scope and aspects, Components of IR system (K1, K2)
1.2 Factors affecting Industrial Relation, Approaches to Industrial Relations (K1, K2)

1.3 Labour Force in India: Structure, Composition and Trends, (K1,K2,K3)
1.4 Critical Challenges (K1, K2, K3)
1.5 Future of Industrial Relations (K1, K2, K3, K4)
1.6 Role of Government of in Industrial Relations (K1,K2, K3)

Unit II: Trade Unionism   (15 hours)

2.1 Trade union, Concept, Features (K1, K2)
2.2 Functions, Challenges (K1, K2)
3.3 Trade Union Recognition (K1, K2, K3,)
2.4 Trade Unions in India: ILO-AITUC- CTUO- CITU- INTUC (K1, K2, K3,K4)
2.5 Managerial Trade Unions (K1, K2, K3)
2.6 Women in Trade Union (K1, K2, K3)

Unit III: Dispute Resolution and Industrial Harmony   (15 hours)

3.1 Industrial Conflicts, Causes and Consequence, Classification(K1, K2,)
3.2 Industrial Disputes Act 1947, Software Professionals, Authorities under This Act
 (K1, K2, K3)
3.3 Notice of Change, Reference of Disputes to Boards, Courts, or Tribunals,
Procedure, Powers and Duties of Authorities (K1, K2, K3,K4)
3.4 Unfair Labour Practices (K1, K2, K3)
3.5 General Prohibition on Strikes and Lockouts, Forms of Strike, (K1, K2, K3)
3.6 Tripartite - Types andLevels. (K1, K2, K3)

Unit IV: Grievances Procedures and Collective Bargaining(15 hours)

4.1 Grievances, Nature, Causes, Grievance Procedure,(K1, K2)
4.2 Misconduct, Approaches to deal with Indiscipline (K1, K2,)
4.3 Punishment-Procedure for punishment, Types of punishment under standing
Orders (K1, K2,K3)
 4.4 Collective Bargaining and Stake Holders (K1,K2, K3)
 4.5 Negotiating Techniques and Skills- Stages of Negotiation (K1, K2, K3,K4)
 4.6 Factors Contributing to Success or failure of collective bargaining.
(K1, K2, K3)

Unit V: Technological Change and Settlement of Machinery   (15 hours)

5.1 Technological Change, Management Strategy, Management Strategy and
approach, Managing Good Industrial Relations, Ten Golden Rules for Good Industrial
Relations(K1, K2, K3, K4)
5.2 Conciliation(K1, K2)
5.3 Mediation (K1, K2)
5.4 Arbitration, concept, Approaches, Advantages & Disadvantages, Types, Qualification,
Procedure for investigation & Submission of Awards (K1, K2, K3,K4)
5.5 Adjudication, Socio-economic importance, Types, Three tier system of Adjudication (K1,
K2, K3)

5.6 Model principles for reference of disputes of adjudication, Central IR Machinery in India (K1, K2, K3)

Note: Case studies for all Units. (K5.K6)

Text Books

1. C.S.Venkata Ratnam - Manoranjan Dhal –Industrial Relations, 2nd Edition- Oxford Higher Education,2017
2. S.C.Srivastava - Industrial Relations and Labour Laws, 5th Edition - Vikas Publication,2007

Reference Books

1. Dwivedi R.S. - Human Relations and Organizational Behaviour, 14th Edition - MacMillan India Ltd., New Delhi,1997.
2. Ratna Sen - Industrial Relations in India: Shilling Paradigms, 2"d Edition Macmillan India Ltd., New Delhi,2011.

Websites

1. www.industrialrelations.nsw.gov.au
2. www.coursera.org

SYSYTEM SPECIALIZATION

SEMESTER -III

PESSA20- ELECTIVE IV A - CLOUD COMPUTING

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PESSA20	Cloud Computing	Theory	Core Elective	6	3	100

OBJECTIVES
1. To enable the evolution and role of Cloud Computing in business integration.
2. To integrate Cloud architecture with various virtualized datacenters.

3. Able to understand Cloud architecture, design, development and implementation
4. To enable the students understand the concept of Grid Computing and Networking.
5. To get an idea on the concept Internet of things.

COURSE OUTCOMES

The learners will be able to

CO1: Understand how Cloud is evolved and will come out with good conceptual knowledge
in Cloud Computing

CO2: Analyze the services, and platforms in Cloud

CO3: Come with awareness on various cloud providers

CO4: Attain knowledge of Gridding and networking

CO5: Enable the students to have a skill with Internet of Things

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	H	M	H	H	H
CO2	H	H	M	H	M	H
CO3	H	H	M	M	M	H
CO4	M	M	H	H	H	H
CO5	H	M	H	M	M	H

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	M	M	L
CO2	H	M	H	H	M	L
CO3	M	M	H	M	H	H
CO4	H	M	M	H	H	H
CO5	M	L	H	M	H	L

H-HIGH (3), M-MODERATE (2), L-LOW (1)

Unit I –Introduction (15 hours)

1.1 Cloud Computing Basics – Overview (K1, K2, K3)
1.2 Applications – Benefits (K1, K2, K3)
1.3 Limitations – Security Concerns (K1, K2, K3)
1.4 Clustering – Virtualization (K1, K2, K3)
1.5 Types of Cloud Services (K1, K2, K3)
1.6 Cloud Titans (K1, K2, K3)

Unit II - Cloud Architecture over Virtualized Data Centers (15 hours)

2.1 Cloud Computing and Service Models (K1, K2, K3)
2.2 Data Center Design and Interconnection Network (K1, K2, K3,K4)
2.3 Architectural Design of Compute and Storage Clouds (K1, K2, K3,K4)
2.4 Public Cloud Platform (K1, K2, K3)
2.5 Inter Cloud Resources Management (K1, K2, K3)
2.6 Cloud Security and Trust Management (K1, K2, K3,K4)

Unit III -Cloud Programming and Software environment (15 hours)

3.1 Services and Service Oriented Architecture (K1, K2, K3, K4)
3.2 Features of Cloud and Grid Platforms (K1, K2, K3, K4)
3.3 Programming support of Google App Engine (K1, K2, K3, K4)
3.4 Programming on Amazon AWS (K1, K2, K3, K4)
3.5 Programming on Microsoft Azure (K1, K2, K3, K4)
3.6 Emerging Cloud Software environment (K1, K2, K3)

Unit IV -Grid computing and Peer to peer computing (15 hours)

4.1 Grid Architecture and Services modeling (K1, K2, K3, K4)
4.2 Grid Application Trends and Security Measures (K1, K2, K3, K4)
4.3 Peer to Peer Computing Systems (K1, K2, K3, K4)
4.4 P2P Overlay Network and Properties (K1, K2, K3, K4)
4.5 Routing and Proximity- Fault tolerance (K1, K2, K3, K4)
4.6 Securing Overlays to Prevent DDoS Attack (K1, K2, K3, K4)

Unit V -Ubiquitous cloud and Internet of Things (15 hours)

5.1 Ubiquitous Computing - Cloud trends in supporting ubiquitous computing (K1, K2, K3)

5.2 Performance of distributed systems and cloud (K1, K2, K3)

5.3 Internet of Things Concepts (K1, K2, K3)

5.4 Enabling technologies for the Internet of Things (K1, K2, K3, K4)

5.5 Innovative applications of Internet of things (K1, K2, K3, K4)

5.6 Online social and professional networking (K1, K2, K3).

Note: Case studies for all units. (K5.K6)

Text Books

1. Anthony T. Velte ,Toby J. Velte, RobertElsenpeter -Cloud Computing : A practical approach – Tata McGrawHill, 2010
2. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra- Distributed and Cloud Computing : From Parallel Processing to the Internet of Things–, 1ˢᵗ Edition Elsevier2017

Reference Books
1. JohnW. Rittinghouse and James F. Ransome, ‒Cloud Computing Implementation,Management and Security‖, CRC Press, Taylor & Francis Group, Boca Raton London, New York, 2010.
2. Cloud Computing: From Beginning to End – Ray J Rafels CreateSpace Independent Publishing Platform, April 1,2015

Websites

1. www.coursera.org
2. www.edx.org

SEMESTER - III

PESSB20 – ELECTIVE IV B - DIGITAL BUSINESS AND E COMMERCE

Year/ Sem	Course Code	Title of the Course	Course Category	H/W	Credits	Marks
II / III	PESSB20	Digital Business and E Commerce	Core Elective	6	3	100

OBJECTIVES

1. To gain domain knowledge in all aspects of Digital and E-Commerce environment.
2. To enhance the technologies used in digital business.
3. To implement the conceptual and practical knowledge of E- CRM and E- SCM concepts in the workplace
4. To establish awareness of using digital payment methodologies from diverse aspects of technology.
5. To enhance various E- commerce strategies to master in the digital business environment.

COURSE OUTCOMES

The learners will be able to

CO1: Understand about emergence of E-commerce

CO2: Analyze various technologies used to develop digital business environment

CO3: Understand the concepts of E- marketing and Digital payment

CO4: Students adhere to the values and ethics relevant to the digital payment in business environment

CO5: Have knowledge to establish new strategies and master in E- Commerce.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	H	H	H	H
CO2	H	H	H	H	M	H
CO3	M	M	H	M	H	H
CO4	M	M	H	M	H	H
CO5	H	H	M	H	H	M

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	M	M	M
CO2	H	M	H	H	H	M
CO3	H	M	H	M	H	L
CO4	L	M	M	M	H	H
CO5	L	M	H	M	H	M

H-HIGH (3), M-MODERATE (2), L-LOW (1)

Unit I - Introduction to E-Commerce (15 hours)

1.1 Emergence of the Internet – Emergence of the World Wide Web (K1, K2, K3)

1.2 Advantages and Disadvantages of E- commerce (K1, K2, K3)

1.3 BAM Model - Online Extension of a BAM Model (K1, K2, K3)

1.4 Transition of E-commerce in India – E-Transition Challenges for Indian Corporates (K1, K2, K3)

1.5 E- Business Models Based on Transaction Parties (K1, K2, K3, K4)

1.6 E- Business Models Based on Transaction Types (K1, K2, K3, K4)

Unit II - E-Commerce Enabling Technologies and E-Security (15 hours)

2.1 Digital Business concepts -Internet Client-Server Applications (K1, K2, K3)

2.2 Networks and Internets: Communication Switching (K1, K2, K3)

2.3 Developments in Transmission – Network Routers – The Internet Protocol Suite (K1, K2, K3)

2.4 Naming Conventions – URLs – Search Engines (K1, K2, K3)

2.5 Software Agents – Internet Service Provider (K1, K2, K3)

2.6 Information Security Environment in India (K1, K2, K3)

Unit III - Digital Business Ecosystems (15 hours)

3.1 E-Marketing: Traditional Marketing –Identifying Web Presence Goals (K1, K2, K3,K4)

3.2 The Browsing Behavior Model – Online Marketing – E-Advertising (K1, K2, K3, K4)

3.3 E-Payment Systems: Main Concerns in Internet Banking – People Drive Change – Digital Payment Requirements (K1, K2, K3, K4)

3.4 Digital Token-based E-payment Systems – Classification of New Payment Systems (K1, K2, K3, K4)

3.5 Properties of Electronic Cash – Cheque Payment Systems on the Internet (K1, K2, K3, K4)

3.6 Risk and E-Payment Systems- E Procurement (K1, K2, K3)

Unit IV - E-CRM & E-SCM   **(15 hours)**

4.1 E-Customer Relationship Management: Introduction- Typical Business Touch Points(K1, K2, K3, K4)

4.2 CRM and workflow Automation – Customer Relationship Management System for a Bank (K1, K2, K3)

4.3 Social Media Marketing (K1, K2, K3, K4)

4.4 E-Supply Chain Management: Supply Chain – Fulfilling Customer's Needs – Smart Chains, Smarter Gains

(K1, K2, K3,K4)

4.5 SCM in Wal-Mart World – The pay-off –Seven Ways to Reduce Inventory –E-SCM Provides

"Real-time"Benefits(K1, K2, K3)

4.6 The Strategic Advantage - E-Supply Chain Components and Architecture –Major Trends in E-SCM

(K1, K2, K3)

Unit V - Digital Business Web Design   **(15 hours)**

5.1 E-Strategy: Information and Strategy- The Virtual Value Chain (K1, K2, K3)

5.2 Seven Dimensions of E-Commerce Strategy (K1, K2, K3)

5.3 Value Chain and E-Strategy (K1, K2, K3)

5.4 Planning the E-Commerce Project. (K1, K2, K3, K4)

5.5 Effective Web Design: Requirements of Intelligent Websites (K1, K2, K3)

5.6 Setting Website Goals and Objectives – Strategies for Website Development (K1, K2, K3)

Note: Case studies for all Units. (K5.K6)

Text Books
1. P.T. Joseph, S.J. - E-Commerce, An Indian Perspective, PHI Publications, 4th Edition2012.
2. Gary.P.Schneider - Ecommerce, Cengage Learning, 9th Edition,2011

Reference Books
1. Ravi Kalakota- Electronic Commerce, Pearson Education,10thEdition,2012..
2. Bharat Bhasker- Electronic Commerce, Frame Work Technologies and Applications, Tata McGraw Hill Publications, 3rd Edition, 2008.

Websites
1. www.shopify.com

2. www.coursera.org

PESSC20 - ELECTIVE IV C - DECISION SUPPORT AND BUSINESS INTELLIGENCE

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PESSC20	Decision Support and Business Intelligence	Theory	Core Elective	6	3	100

OBJECTIVES
1. To gain domain knowledge in all aspects of Decision Support system and Business Intelligence.
2. To enhance the data mining skills
3. To implement the conceptual and practical decision making in the workplace
4. To establish awareness in various decision modeling technology.
5. To master in decision making skills to work in an organization as a team or to start an enterprise.

COURSE OUTCOMES

The learners will be able to

CO1: Enable the student to understand about decision support systems

CO2: Able to analyze various phases of decision making and components of decision support system

CO3: Understand the modeling approaches of decision making and can implement in their organization.

CO4: Be able to enhance the data mining skills by applying knowledge discovery

CO5: Master in decision making skills on analyzing the data warehousing and mining concepts.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	H	M	H	M

CO4	H	M	H	H	H	M
CO5	M	M	M	M	H	H

CO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	M	M	L
CO2	H	M	M	M	H	L
CO3	M	M	H	H	H	M
CO4	L	M	M	M	H	M
CO5	M	L	H	M	H	L

H-HIGH (3), M-MODERATE (2), L-LOW (1)

Unit I - Introduction to Decision Support Systems   (15 hours)

1.1 Introduction – Changing Business Environments and Computerized Decision Support (K1, K2, K3)
1.2 Managerial Decision Making – Computerized Support for Decision Making (K1, K2, K3)
1.3 An Early Framework for Computerized Decision Support – Concept of Decision support Systems (K1, K2, K3)
1.4 System View of Decision Support (K1, K2, K3)
1.5 Tools & Techniques of Managerial Decision Support (K1, K2, K3)
1.6 Implementing Computer Based DSS–Models (K1, K2, K3)

Unit II - DSS Phases & Components   (15 hours)

2.1 Phases of the Decision Making Process: The Intelligent Phase – The Design Phase (K1, K2, K3, K4)
2.2 The Choice Phase – The Implementation Phase (K1, K2, K3, K4).

2.3 How are Decisions Supported DSS Configurations – Characteristics & Capabilities (K1, K2, K3, K4)

2.4 Components: The Data Management Subsystem – The Model Management Subsystem (K1, K2, K3, K4)

2.5 The User Interface Subsystem – The Knowledge Based Management Subsystem (K1, K2, K3, K4)

2.6 The Decision Support System: User- Hardware (K1, K2, K3, K4)

Unit III - DSS: Modeling & Analysis   (15 hours)

3.1 Management Support Systems Modeling – Static & Dynamic Models (K1, K2, K3, K4)

3.2 Static & Dynamic Models- Certainty, Uncertainty & Risk V

3.3 Management Support Systems Modeling with Spreadsheets – Decision Analysis with Decision Tables & Decision Trees (K1, K2, K3, K4)

3.4 The Structure of Mathematical Models – Mathematical Programming Optimization (K1, K2, K3, K4)

3.4 Multiple Goals, Sensitivity Analysis, What – IF Analysis & Goal Seeking (K1, K2, K3, K4)

3.6 Problem Solving Search Methods –Simulation (K1, K2, K3, K4)

Unit IV - Introduction to Data Mining   (15 hours)

4.1 Introduction to Data Mining (K1, K2, K3, K4)

4.2 Knowledge Discovery (K1, K2, K3, K4)

4.3 Patterns that can be Mined (K1, K2, K3, K4)

4.4 Technologies used (K1, K2, K3)

4.5 Applications in data mining (K1, K2, K3)

4.6 Issues in Data Mining (K1, K2, K3)

Unit V - Introduction to Data Warehousing   (15 hours)

5.1 Data Warehouse Basic Concepts –Difference between Operational Database and Data ware house (K1, K2, K3, K4)

5.2 Data Warehousing A multitier Architecture – Data Warehouse models Enterprise Warehouse, Data mart and Virtual Ware house   - Meta data repository (K1, K2, K3, K4)

5.3 Data Warehouse Modeling : Data Cube (K1, K2, K3, K4)

5.4 Data Warehouse Modeling OLAP (K1, K2, K3, K4)

5.5 Data Warehouse Design- Business Analysis Framework- Design Process (K1, K2, K3, K4)

5.6 Data Warehouse Usage for Information Processing – OLAP to Multidimensional Data mining (K1, K2, K3, K4)

Note: Case studies for all Units. (K5.K6)

Text Books

1. Efraim Turban and Jay E. Aronson - Decision Support System and Intelligent Systems - Prentice Hall International, 15th Edition,2002.
2. Jaiwei Ham and Micheline Kamber -Data Mining concepts and techniques, Kauffmann Publishers, 3rd Edition, 2012.

Reference Books
1. Janakiraman V. S and SarukesiK- Decision Support Systems , Prentice Hall of India, 11th Edition,2009.
2. George.M.Marakas - Decision Support System , PHI Learning, 2ndEdition,2003.

Websites
1. www.dssresources.com
2. www.coursera.org

HOSPITAL ADMINISTRATION SPECIALIZATION

SEMESTER - III

PEHCA20 - ELECTIVE V A - HOSPITAL DESIGN AND OPERATION MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEHCA20	Hospital Design and Operation Management	Theory	Core Elective	6	3	100

OBJECTIVES
1. To recognize the importance and need for planning of hospital services and the factors involved
2. To identify, differentiate and interrelate the steps and roles of various personnel involved in overall planning and implementation of the hospital
3. To identify, differentiate and evaluate the functions and requirements for clinical, engineering and support services in the hospital
4. To identify and plan for compliance of the hospital and services to legal requirements
5. To develop, organize and implement a hospital design plan

COURSE OUTCOMES

The learners will be able to

CO1: Understand and infer the importance of hospital planning and identify the factors influencing outcomes To identify, understand and differentiate the various steps involved in hospital planning

CO2: Understand, recognize and interrelate the steps involved in hospital planning

CO3: Gain the knowledge in the functions and requirements of various clinical services in the hospital

CO4: Understand the functions and requirements of various support services in the hospital

CO5: Be able to develop, plan and implement engineering services for the hospital.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	H	M	M
CO2	H	H	M	H	M	H
CO3	M	H	M	H	H	H
CO4	H	H	M	M	H	H
CO5	M	M	H	M	H	M

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	M	L	H
CO2	H	L	H	M	M	M
CO3	H	H	L	L	M	L
CO4	H	H	L	L	M	L
CO5	M	H	M	M	H	L

H-HIGH (3), M-MODERATE (2), L-LOW (1)

Unit 1: Introduction to Hospital Planning (15 hours)

1.1 Market survey - Assessment of the demand and need for hospital services (K1, K2, K3, K4)

1.2 Factors influencing hospital utilization (K1, K2, K3, K4)

1.3 Steps In Hospital Planning: Need Assessment - Bed planning – Land requirements (K1, K2, K3, K4)

1.4 Project cost – Space requirements –Hospital drawings - Documents- (K1, K2, K3, K4)

1.5 Project management & implementation (K1, K2, K3, K4)

1.6 Project Management tools - Gantt chart and other project planning tools (K1,K2,K3,K4)

Unit 2: Hospital planning   (15 hours)

2.1 Principles of hospital planning(K1,K2,K3,K4)

2.2 Formation of Hospital Planning Team- Financial Planning (K1,K2,K3,K4)

2.3 Statutory legal requirements - Hospital planning (K1,K2,K3,K4)

2.4 Planning process – size of the hospital – site selection - Specialties – Bed allocation (K1,K2,K3,K4)

2.5 Human Resource in hospitals - Equipment planning - Conception to commissioning (K1,K2,K3,K4)

2.6 Site development - Construction of Hospital–Commissioning(K1,K2,K3,K4)

Unit 3: Planning for Clinical services   (15 hours)

3.1 Planning, - Design layout - functional flow of clinical services (K1,K2,K3,K4)

3.2 Outpatient Services - Accident and Emergency (K1,K2,K3,K4)

3.3 Inpatient Services – Nursing services (K1,K2,K3,K4)

3.4 Hospital Infection Control(K1,K2,K3,K4)

3.5 Intensive Care Unit (K1,K2,K3,K4)

3.6 Operation Theatre - Day care (K1,K2,K3,K4)

Unit 4: Planning for Support services   (15 hours)

4.1 Planning, Design, layout (K1,K2,K3,K4)

4.2 Functional flow of support services: Pharmacy (K1,K2,K3,K4)

4.3 Diagnostic labs - Radiology - Cath labs (K1,K2,K3,K4)

4.4 Physiotherapy - Blood bank - Central Sterile Supply Department (K1,K2,K3,K4)

4.5 Medical records - Hospital Information System (K1,K2,K3,K4)

4.6 Mortuary - Central Medical Gas System(K1,K2,K3,K4)

Unit 5: Planning for Ancillary support services   (15 hours)

5.1 Planning, Design, layout (K1,K2,K3,K4)

5.2 Functional flow of ancillary support services(K1,K2,K3,K4)

5.3 Engineering Services (Biomedical Engineering, Mechanical Engineering & HVAC, Water Supply and Sanitary Service, Electrical Engineering, Civil Engineering) (K1,K2,K3,K4)

5.4 Communication Service - Biomedical Waste Disposal – Transport Service -

Laundry Services - Dietary Service (K1,K2,K3,K4)

5.5 Administrative Services - Quality Services - House Keeping Department (K1,K2,K3,K4)

5.6 Hospital Maintenance – Estates management (K1,K2,K3,K4)

Note: Case studies for all Units. (K5.K6)

Text books:

1. Kunders G.D, Gopinath S, and Katakama, Hospital Planning, Design and Management, Tata Mc.Graw Hill, New Delhi, 1999.
2. Arun Kumar, (ed) Encylopedia of Hospital Administration and Development, Anmol Publications, New Delhi, 20009

References

1. Srinivasan A. V. (ed) Managing a modern hospital, Response Books New Delhi, 2000
2. Sakharkar B.M. Principles of Hospital Administration and Planning, Jaypee publication, 2009

Websites

1. swayam.gov.in
2. www.wbdg.org

PEHCB20- ELECTIVE V B - HOSPITAL MATERIALS AND EQUIPMENT MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PEHCB20	Hospital Materials and Equipment Management	Theory	Core Elective	6	3	100

OBJECTIVES

1. To understand the structure and overall functioning of the materials management
2. To identify, differentiate and analyze the functions of materials management

departments
3. To recognize, evaluate and design the inventory control system for economical functioning of the hospital
4. To categorize, plan and implement audits of inventory and materials system
5. To develop, organize and implement the materials management system in

the hospital

COURSE OUTCOMES

The learners will be able to

CO1: Understand and interpret the role of materials management in the hospital. To understand, recognize and interrelate the components of purchase system in materials management

CO2: Understand, recognize and interrelate the components of purchase system in materials management. To develop and critique a purchase system for the hospital

CO3: Understand, interrelate aspects, develop and critique the stores system for the hospital

CO4: Be able to plan and implement equipment purchase and utilization assessment systems

CO5: Recognize the importance of new technologies and trends in materials management and select the appropriate methods for sustainable economic and efficient functioning To plan and develop long term strategies for materials planning in the hospital.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	M	H	M	H	M	H
CO2	M	H	M	H	M	H
CO3	H	M	H	H	M	H
CO4	H	M	H	M	H	H
CO5	M	H	H	M	H	M

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	L	H	M
CO2	H	M	H	L	M	M
CO3	H	M	H	L	M	M

CO4	M	H	H	L	H	M
CO5	M	H	M	M	M	H

H-HIGH(3), M-MODERATE(2), L-LOW(1)

Unit – I Introduction (15 hours)

1.1 Material - Functions of materials management (K1,K2,K3)
1.2 Objectives of material management – Material management in health care (K1,K2,K3,K4)
1.3 Integrated material management – Myths and realities of material management (K1,K2,K3,K4)
1.4 Hospital Stores - Functions and types of hospital stores (K1,K2,K3,K4)
1.5 Planning of hospital stores – Indenting of stores – Duties of store keeper (K1,K2,K3,K4)
1.6 Control of stores – Location and layout - legal aspects of purchasing. (K1,K2,K3,K4)

Unit – II Purchase and Procurement (15 hours)

2.1 Purchasing - Principles of purchasing – Purchase Cycle (K1,K2,K3,K4)
2.2 Fundamentals of purchasing – Advantages and disadvantages – Rules regarding purchase order (K1,K2,K3,K4)
2.3 Tender System & process – Types of contracts (K1,K2,K3,K4)
2.4 Inspection of articles – Payment terms
2.5 Registration of Vendors – Advantages and disadvantages -Centralization and decentralization (K1,K2,K3,K4)
2.6 Group purchasing –Purchase selection and audit committees (K1,K2,K3,K4)

Unit – III Inspection and Stores (15 hours)

Store –Principles - Functions of store- Types of store (K1,K2,K3,K4)
3.1 Inventory - inventory control – Types of Inventory cost (K1,K2,K3,K4)
3.2 Types of Inventory Control Pareto analysis - ABC/VED/SDE/XYZ/HML/GOLF/MNG/SOS (K1,K2,K3,K4)
3.3 Analysis – Lead Time – Buffer stock – Reorder level – Economic Order Quantity (EOQ) – Ordering system – Bin system – Stock verification – Need (K1,K2,K3,K4)
3.4 Techniques. (K1,K2,K3,K4)
3.5 Types of Inventory Control systems (K1,K2,K3,K4)

3.6 Preventive measures- Condemnation and disposal (K1,K2,K3,K4)

Unit – IV Equipment management (15 hours)

4.1 Equipment planning and selection – Steps in equipment selection (K1,K2,K3,K4)
4.2 Equipment utilization – Repair and maintenance of equipment (K1,K2,K3,K4)
4.3 Equipment audit - Equipment Planning and Procurement(K1,K2,K3,K4)
4.4 Importing – Import procedures - Import documentation(K1,K2,K3,K4)
4.5 Methods of payment – Letter of credit – Foreign currency-payments(K1,K2,K3,K4)
4.6 Planning and procurement of spares/accessories/consumables(K1,K2,K3,K4)

Unit – V Recent trends in Materials Management (15 hours)

5.1 Concept and frame work of Supply Chain management (K1,K2,K3,K4)
5.2 Logistics Management - concept of Just in time and central purchasing (K1,K2,K3,K4)
5.3 Integrated Materials Management – RFID - The Internet of Things (K1,K2,K3,K4)
5.4 Strategies for Hospital Equipment planning and Selection (K1,K2,K3,K4)
5.5 Quality improvement tools in stores management (K1,K2,K3,K4)
5.6 Innovation in warehouse and Distribution centers – Material data analytics (K1,K2,K3,K4)

Note: Case studies for all Units. (K5.K6)

Text Books
1. Shakti Gupta, Sunil Kant, Hospital Stores Management, Jaypee Publishers, 2007.
2. Sadiwala C.M & Sadiwala R.C. Materials and Financial Management, New Age International Publishers, 2007

Reference Books
1. Magad E.L. and Amos J.M. Total Materials Management. Springer Science+Business Media. 1989.
2. Gopalkrishnan P. and Haleem A. Handbook of Materials Management. PHI publishers. 2015.

Websites
1. www.acgil.com
2. apps.who.int

PEHCC20- ELECTIVE V C - HOSPITAL QUALITY MANAGEMENT AND LEGAL ASPECTS

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PEHCC20	Hospital Quality Management and Legal Aspects	Theory	Core Elective	6	3	100

OBJECTIVES
1. To understand the structure and overall functioning of various healthcare systems
2. To identify, differentiate and analyze the functions of clinical and non-clinical departments in the hospital
3. To recognize, interrelate, differentiate, evaluate quality standards for hospital and design the an appropriate quality system to comply with standards
4. To plan and develop effective systems for legal compliance in hospital
5. To develop, organize and implement various clinical and non-clinical services in the hospital

COURSE OUTCOMES
The learners will be able to
CO1: Understand and distinguish the role of management and healthcare indictors in the hospital
CO2: Understand, recognize and interrelate the functions of various clinical services in the hospital
CO3: Recognize and interrelate the functions of various non-clinical services in the hospital
CO4: Gain knowledge various aspects of quality in the hospital from the viewpoint of accreditation and certification

CO	PO					
	1	2	3	4	5	6

CO5: Understand the various legal requirements for hospitals and design effective methods to ensure legal compliance in the hospital.

CO1	H	M	H	M	H	M
CO2	H	M	H	M	H	M
CO3	H	H	H	H	H	H
CO4	M	H	M	H	M	H
CO5	M	M	M	H	H	H

CO	**PSO**					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	H	L	M	L
CO2	H	H	L	L	M	L
CO3	H	H	L	L	M	L
CO4	M	H	M	M	L	L
CO5	H	M	M	H	M	H

H-HIGH(3), M-MODERATE(2), L-LOW(1)

Unit 1: Quality Management & Safety   **(15 hours)**

1.1 Principles of Quality Management (K1,K2,K3,K4)
1.2 Structure, Process and Outcome - Quality / Customer Service (K1,K2,K3,K4)
1.3 Quality Foundation, Tools and Techniques - Flow Chart Cause -Effect Diagram - Pareto Diagram Statistical Process Control - Healthcare Quality (K1,K2,K3,K4)
1.4 Business Process Reengineering & other relevant tools and techniques, Safety (K1,K2,K3,K4)

1.5 International Patient Safety Goals (IPSG) – Occupational Health (K1,K2,K3,K4)

1.6 Disaster management – Facility safety: Security - Fire hazards – Engineering Hazards – Radiological hazards. (K1,K2,K3,K4)

Unit 2: Accreditation and Certification   (15 hours)

2.1 ISO Certification - ISQua (K1,K2,K3,K4)

2.2 Accreditation – NABH - QCI - NABL – JCI (K1,K2,K3,K4)

2.3 Accreditation process – NABH Chapters (K1,K2,K3,K4)

2.4 Key Performance Indicators - Gap audit – Clinical audit (K1,K2,K3,K4)

2.5 Management audit – Audit process - Levels of accreditation (K1,K2,K3,K4)

2.6 Tools and methods used for quality assessment and sustainment for accreditation (K1,K2,K3,K4)

Unit 3: Healthcare Laws   (15 hours)

3.1 Clinical Establishments Act - Consumer Protection Act (K1,K2,K3,K4)

3.2   Medical Termination of Pregnancy Act- Prenatal Preconception Diagnostic Techniques Act (K1,K2,K3,K4)

3.3 Human Organ Transplantation Act – Pharmacy Act – Drugs and Cosmetics Act (K1,K2,K3,K4)

3.4 Biomedical Waste Management Handling Rules (K1,K2,K3,K4)

3.5Registration of Births and Deaths Act (K1,K2,K3,K4)

3.6 Licenses/certificates to be maintained: lifts, boilers, pharmacies, biomedical waste disposal, blood bank, radiation related services, generator fuel etc. (K1,K2,K3,K4)

Unit 4: Legal Aspects of Healthcare   (15 hours)

4.1 Rights and responsibilities of patients (K1,K2,K3,K4)

4.2 Doctor patient contract - Law of torts(K1,K2,K3,K4)

4.3 Informed Consent – Confidentiality (K1,K2,K3,K4)

4.4 Medical Malpractice & Negligence (K1,K2,K3,K4)

4.5 Doctrines of jurisprudence in medical profession – Types of offences – Charge Sheet (K1,K2,K3,K4)

4.6 Evidence – Witness (K1,K2,K3,K4)

Unit 5: Ethical Aspects of Healthcare (15 hours)

5.1 Healthcare Ethics – Principles of Ethics (K1,K2,K3,K4)

5.2 Code of Conduct (K1,K2,K3,K4)

5.3 Irrational Drug Therapy (K1,K2,K3,K4)

5.4 Reproductive Medicine – Euthanasia (K1,K2,K3,K4)

5.5 Organ donation and transplantation – Alternative medicine (K1,K2,K3,K4)

5.6 Human experimentation - Technology (K1,K2,K3,K4)

Note: Case studies for all Units. (K5.K6)

Text Books
1. Joseph, Juran's Quality Handbook: The Complete Guide to Performance Excellence, 7th Edition, 2016
2. Nash D.B., Joshi M.S., Ransom E.R. and Ransom S.B (eds). The Healthcare Quality Book. Health Administration Press. 2017

Reference Books
1. National Accreditation Board for Hospitals and Healthcare Providers, NABH Accreditation Standards for Hospitals (5e), 2020
2. Francis C.M, Medical Ethics, Jayepee Publishers, 2007

Websites
1. www.ahaindia.org
2. apps.who.int

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PELMA20	Logistics Management	Theory	Core Elective	6	3	100

OBJECTIVES

1. The course provides the analytical framework for understanding the basic concepts and evolution of logistics.
2. Develop knowledge about the interconnectedness of packaging and logistics with the latest trends.
3. Develop knowledge about key elements of Containers.
4. Enhance analytical skills and capability to synthesize information related to logistics re-engineering.
5. Enhance and develop the skills on international logistics functions.

COURSE OUTCOMES

The learners will be able to
CO1: Analyze how logistical decisions (e.g., facilities, inventory, and transportation) impact the performance of the firm as well as the entire supply chain.

CO2: Analyze the strengths and weaknesses of packing and the emerging trends in the same.
CO3: Develop the strategies that can be taken to find the best paths to route vehicles to deliver and collect goods at multiple stops.
CO4: Develop strategies logistics reengineering and compete with the latest technology.
CO5: Know the basic characteristics of inbound and outbound logistics.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	M	H	M
CO3	H	M	H	M	M	H
CO4	H	H	M	H	H	H
CO5	M	H	M	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	L
CO2	H	L	L	L	L	H
CO3	H	M	M	L	M	L
CO4	H	M	H	L	M	L
CO5	H	L	M	L	H	M

H-HIGH(3), M-MODERATE(2), L-LOW(1)

Unit I : Introduction   **(15 hours)**
1.1 Logistics: Definition, Evolution, Concept, Components (KI, K2, K3)
1.2 Importance, Objectives Logistic Subsystem, the work of Logistics (KI, K2, K3)
1.3 Integrated Logistics, Barrier to Internal Integration (KI, K2, K3)
1.4 Logistics as a Support/Interface/Enabler of Marketing function (KI, K2, K3)
1.5 Logistics as a Support function of Order Fulfillment (KI, K2, K3)
1.6 Assembling &Labeling from Multi storage points, Consignment convergence/divergence and Delivery. (KI, K2, K3)

Unit II: Packaging   **(15 hours)**

2.1 Packaging, Perspectives, Damage protection (KI, K2, K3, K4)

2.2 Material Handling efficiency / Utility, Product characteristics (KI, K2, K3, K4)
2.3 Unitization, Communication, Channel Integration, Alternative materials (KI, K2, K3, K4)
2.4 Traditional materials, Emerging Trends, The purposes of packaging (KI, K2, K3, K4)
2.5 The packaging industry: structure and dynamics, Returnable packaging (KI, K2, K3, K4)
2.6 General packaging principles, Retail logistics packaging, Fresh foods applications (KI, K2, K3, K4)

Unit III : Containerization   (15 hours)
3.1 Major container trades, Two container operators   (KI, K2, K3, K4)
3.2 Container ships; terminals, Container distribution (KI, K2, K3, K4)
3.3 Container types, Non - containerizable cargo (KI, K2, K3, K4)
3.4 Features of containerization (KI, K2, K3, K4)
3.5 Container bases (KI, K2, K3, K4)
3.6 International Convention for Safe Containers.(KI, K2, K3, K4)

Unit IV : Logistics Positioning   (15 hours)
4.1 Logistics reengineering, Reengineering procedure, Logistics environmental assessment,
      Industry competitive Assessment (KI, K2, K3, K4)
4.2 Geo market differentials, Technology assessment, Material energy assessment, Channel structure (KI, K2, K3, K4)
4.3 Economic social projections, Service industry Trends (KI, K2, K3, K4)
4.4 Regulatory posture, Conclusion (KI, K2, K3, K4)
4.5 Time based logistics, alternative logistics strategies (KI, K2, K3, K4)
4.6 Strategic integration, Logistics time based control techniques (KI, K2, K3, K4)

Unit V – International Logistics Functions   (15 hours)
5.1 Introduction (KI, K2, K3, K4)
5.2 Outbound Logistics Functions (KI, K2, K3, K4)
5.3 Inbound Logistics Functions (KI, K2, K3, K4)
5.4 Overall Logistics Activities (KI, K2, K3, K4)
5.5 Logistics Intermediaries (KI, K2, K3, K4)

Note: Case studies for all units. (K5.K6)

Text Books

1. Burt, Dobbler and Starling, World Class Supply Chain Management, TMH 2005Edition
2. Donald J. Bowerson, David J Closs, Logistical Management, Tata

McGraw Hill Edition, Reprint2011.

Reference Books

1. Alan E. Branch, Global Supply Chain Management and International Logistics, Routeledge, 2009
2. Levi, Kaminsky& Levi, Managing the Supply Chain: The Definitive Guide, Mcgraw-Hill, 2003.

Websites

1. www.scmdojo.com
2. www.edx.org

SEMESTER III

PELMB20 - ELECTIVE VI B – EXPORT AND IMPORT MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PELMB20	Export and Import Management	Theory	Core Elective	6	3	100

OBJECTIVES

1. To impart the knowledge on the key functions in export and import process and procedures.
2. To provide understanding to the students on the various modes of logistics.
3. To educate the students in solving issues related to requirements in export and import management.
4. To educate the students in solving issues related to requirements in export and import management related to water carriers.
5. To know all the in depth functionalities of Air Carriers.

COURSE OUTCOMES
The learners will be able to
CO1: Remember the basics of global trade and import and export policies

CO2: Understand various import process and procedures and agencies involved in EXIM process and their role in the international trade
CO3: Acquire knowledge on the various modes of transportation.
CO4: Understand the payment methods, risks and various financing of water carriers.
CO5: Elaborate the procedures of Air Carriers.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	M	H	M
CO2	H	M	H	M	M	M
CO3	M	M	H	H	H	M
CO4	M	H	M	H	M	H
CO5	H	H	H	H	H	H

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	L	M	L	H	M
CO2	H	M	M	M	M	L
CO3	H	L	L	L	L	H
CO4	H	M	H	L	M	L
CO5	H	M	M	L	M	L

H-HIGH(3), M-MODERATE(2), L-LOW(1)

Unit I: Introduction   **(15 hours)**

1.1 Export & Import – Introduction (K1, K2, K3, K4)
1.2 Definitions - Evolution of Export & Import (K1, K2, K3, K4)
1.3 Foreign Trade (K1, K2, K3, K4)
1.4 Institutional Framework and Basics (K1, K2, K3, K4)
1.5 Multinational Organizations & Structure (K1, K2, K3, K4)
1.6 International Business Scenario (K1, K2, K3, K4)

Unit II – Procedures In Customs Clearance And Documentation   **(15 hours)**

2.1 Export Procedures and Documents , Customs Clearance of Import and Export Cargo (K1, K2, K3, K4)

2.2 Methods and Instruments of Payment and Pricing (K1, K2, K3, K4)

2.3 INCOTERMS , Marine Insurance , Methods of Financing Exporters (K1, K2, K3, K4)

2.4 Export - Import , Documentation and Steps - Export (K1, K2, K3, K4)

2.5 Import Strategies and Practice, Export Marketing (K1, K2, K3, K4)

2.6 Business Risk Management and Coverage , Export Incentive Schemes (K1, K2, K3, K4)

Unit III: Transportation (15 hours)

3.1 Role of transportation ,Transport Decision (K1, K2, K3, K4)

3.2 Legal classification of carriers , Intermodal transportation (K1, K2, K3, K4)

3.3 Transportation management , Documentation (Domestic and International) , Bases for rates (K1, K2, K3, K4)

3.4 Transportation services , Characteristics of Modes of Transportation (K1, K2, K3, K4)

3.5 Characteristics of Shipping Industry , World Shipping (K1, K2, K3, K4)

3.6 Containerization and Leasing Practices. (K1, K2, K3, K4)

Unit IV: Water Carriers (15 hours)

4.1 Types of ships , Liners , Tramps , Specialized vessels and their trades (K1, K2, K3, K4)

4.2 Cargo stowage/packing overview, Stowage of cargo, Types and characteristics of cargo ,
    Cargo and container handling equipment (K1, K2, K3, K4)

4.3 Types of packing, Dangerous cargo. , Export controls (K1, K2, K3, K4)

4.4 Customs tariff, Customs Freight Simplified Procedures (CFSP) (K1, K2, K3, K4)

4.5 New Export System (NES), Unique Consignment Reference (UCR) (K1, K2, K3, K4)

4.6 Customs reliefs, Importation and exportation of goods, Ship's papers, Ship's protest
(K1, K2, K3, K4)

Unit V: Air Carriers (15 hours)

5.1 Types of Carriers, Private Carriers, For-Hire Carriers (K1, K2, K3, K4)

5.2 Market Structure, Number of Carriers, Characteristics, General (K1, K2, K3, K4)

5.3 Speed of Service, Length of Haul and Capacity-Accessibility and Dependability,
    Equipments (K1, K2, K3, K4)

5.4 Types of Vehicles, Terminals, Cost Structure Fixed Versus Variable Cost (K1, K2, K3,K4)

5.5 Components, Fuel, Labor , Equipment ,Economies of Scale/Economies of Density
,

Rates, Pricing (K1, K2, K3, K4)

5.6 Operating Efficiency, Current Issues, Safety, Security (K1, K2, K3, K4)

Note: Case studies for all units. (K5.K6)

Text Books :

1. UshaKiran Rai,‗Export-Import and Logistics Management', PHI Learning Pvt. Ltd.,2007
2. John J. Coyle, C. John Langley, Brian J. Gibson, Robert A. Novack, Edward J. Bardi, A logistics approach to supply chain management, Cengage Learning, 2009.

Reference Books

1. Rama Gopal. C., ‗Export Import Procedures - Documentation And Logistics', New Age International,2007
2. MB. Stroh, A Practical Guide to Transportation and Logistics, Logistics Network Inc.2006

Websites

1. howtoexportimport.com
2. www.iiiem.in

PELMC20 - ELECTIVE VI C - GREEN SUPPLY CHAIN AND LOGISTICS MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PELMC20	Green Supply Chain	Theory	Core	6	3	100

		and Logistics Management	Elective			

OBJECTIVES
1. To provide foundational knowledge associated with the green supply chain.
2. To teach the implication of today's most pressing environmental issues.
3. To describe how the various green supply chain practices can actually save money, increases efficiency and reduce delivery time.
4. To understand the concepts of green manufacturing.
5. To have an indepth knowledge on environmental impact of green logistics.

COURSE OUTCOMES
The learners will be able to
CO1: Remember the basics of Green Supply Chain Management.
CO2: Understand various procedures in ECO Design with its drivers.
CO3: Acquire knowledge on green purchasing.
CO4: Understand the concepts in green manufacturing and its challenges.
CO5: Be aware on green logistics and its drivers.

CO	PO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	H	M	M	H	H
CO2	M	H	M	M	H	M
CO3	H	M	H	H	H	M
CO4	H	M	H	H	M	M
CO5	M	H	M	M	M	H

CO	PSO					
	1	**2**	**3**	**4**	**5**	**6**
CO1	H	M	H	L	M	L
CO2	H	L	M	L	H	M
CO3	H	M	M	L	M	L
CO4	H	M	M	M	M	L
CO5	H	L	L	L	L	H

Unit I Introduction   (15 hours)

1.1 Introduction (KI, K2, K3)
1.2 Traditional Supply Chain and Green Supply Chain (KI, K2, K3)
1.3 Environmental Concern and Supply Chain (KI, K2, K3)
1.4 Closed-loop Supply Chain (KI, K2, K3)
1.5 Corporate Environmental Management, Green Supply Chain (GSCM) (KI, K2, K3)
1.6 Definition, Basic Concepts, GSCM Practices (KI, K2, K3)

Unit II Eco-Design   (15 hours)

2.1 Design for the Environment (DFE) or Eco-Design (KI, K2, K3)
2.2 Eco-Design and Supplier Relationships (KI, K2, K3)
2.3 Definitions of Eco-Design (KI, K2, K3)
2.4 Tools of Product Eco-Design (KI, K2, K3)
2.5 Involving suppliers in product eco-design (KI, K2, K3)
2.6 Drivers, Challenges and Successful factors (KI, K2, K3)

Unit III Green Purchasing   (15 hours)

3.1 Green Procurement and Purchasing (KI, K2, K3, K4)
3.2 Definitions of green purchasing (KI, K2, K3, K4)
3.3 Drivers of green purchasing (KI, K2, K3, K4)
3.4 Green purchasing strategies (KI, K2, K3, K4)
3.5 Green purchasing performance measurement (KI, K2, K3, K4)
3.6 Green Supplier Development and Collaboration. (KI, K2, K3, K4)

Unit IV Green Manufacturing   (15 hours)

4.1 Green Manufacturing or Production (KI, K2, K3, K4)
4.2 Evolution, Definitions , 4Re's: recycling, remanufacturing, reuse and reduction (KI, K2,
      K3, K4)
4.3 Closed-loop Manufacturing (KI, K2, K3, K4)
4.4 ISO 14000 systems (KI, K2, K3, K4)
4.5 Life Cycle Analysis (LCA) (KI, K2, K3, K4)
4.6 Lean Manufacturing for Green Manufacturing or Production. (KI, K2, K3, K4)

Unit V Green Logistics and Transportation   (15 hours)

5.1 Green Logistics and Transportation (KI, K2, K3, K4)

5.2 Definitions of Green Logistics (KI,K2,K3,K4)
5.3 Critical drivers of Green Logistics (KI, K2, K3, K4)
5.4 Green transportation and logistics practices (KI, K2, K3, K4)
5.5 Environmental impacts of transportation and logistics (KI, K2, K3, K4)
5.6 Closing the Loop: Reverse Logistics. (KI, K2, K3, K4)

Note: Case studies for all units. (K5.K6)

Text Books
1. Joseph Sarkis, Yijie Dou. Green Supply Chain Management: A Concise Introduction, Routledge, 2017.
2. Charisios Achillas, Dionysis D. Bochtis, Dimitrios Aidonis, Dimitris Folinas. Green Supply Chain Management, Routledge, 2018.

Reference Books
1. Hsiao-Fan Wang, Surendra M. Gupta. Green Supply Chain Management: Product Life Cycle Approach, McGraw Hill publishing, 2011
2. Stuart Emmett, Vivek Sood. Green Supply Chains: An Action Manifes by Stuart Emmett, Wiley publications

Websites
1. www.supplychainbrain.com
2. www.masterstudies.com